

ABET
Self-Study Report

for the

B.S. in Computer Science

at

Lamar University

Beaumont, Texas

June 26, 2019

CONFIDENTIAL

The information supplied in this Self-Study Report is for the confidential use of ABET and its authorized agents and will not be disclosed without authorization of the institution concerned, except for summary data not identifiable to a specific institution or documents in the public domain.

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BACKGROUND INFORMATION

A. Contact Information

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B. Program History

Computer Science was established as a Division in the College of Engineering in 1976. In 1979 it became the Department of Computer Science. Dr. Bill Nylin served as the first Chair of from 1976 to 1979. Dr. Bobby Waldron served as Chair from 1979 to 1988. Dr. David Reed served as interim Chair from 1988 to 1989. Dr. Ronald King served as Chair from 1989 to 1993. Dr. Lawrence Osborne served as Chair from 1993 to 2012. The current Chair is Dr. Stefan Andrei.

Major changes in the Department include:

1. First ABET accreditation in 2001.
2. Moved from College of Engineering to College of Arts and Sciences in 2004.
3. Employment of two permanent full-time non-tenure-track faculty members in 2007.
4. Employment of full-time system administrator in 2008.
5. Development of online classes beginning in 2009.
6. Added two elective courses in Android programming in 2016.
7. Added new elective course in Secure Software Engineering in 2017.
8. Added two elective courses in 3D modeling and animation in 2018.
9. Added new elective course in Cybersecurity in 2019.
10. Updated requirements for the BS in Computer Science degree in 2019 to include required course in Distributed Systems and requirement that students take either Secure Software Engineering or Cybersecurity course. These were added to fulfill new ABET requirements. These new degree requirements will go into effect during the 2019-2020 academic year.
11. Modified Student Outcomes according to new ABET requirements starting 2019-2020 academic year.

The last ABET review was in 2013. The program was re-accredited for six years.

C. Options

Students have an option to select four computer science electives and one free elective.

D. Program Delivery Modes

Students have options to complete courses on campus, online or by enrolling in hybrid courses. Courses are offered during both the day and evening. Hybrid courses have fewer on campus meetings than traditional on campus courses and feature a significant amount of material placed online by the instructor. Students are able to complete the degree entirely online if they choose.

E. Program Locations

All courses are offered from the main campus of Lamar University in Beaumont, Texas.

F. Public Disclosure

Information available online, including ABET Program Educational Objectives, student outcomes and enrollment and graduation data, is posted on the department website at:

Department ABET website:

<https://www.lamar.edu/arts-sciences/computer-science/department/abet.html>

G. Deficiencies, Weaknesses or Concerns from the Previous Evaluation and the Actions Taken to Address Them

As a result of the most recent ABET visit in 2013, the following changes were made (text summarized from Final Statement from ABET to Lamar University, dated August 7, 2014).

1. The visiting team from ABET that came in October 2013 found one program weakness related to the Program Educational Objectives (PEOs). The team was concerned that the program Advisory Board was not regularly allowed to review and provide input regarding the PEOs.
 - a. This was resolved and reclassified by ABET from a weakness to a concern. The department has altered the Advisory Board's procedures so that the board will review program educational objectives at least every two years. In designated years, the department will electronically forward a copy of the current PEOs prior to the board's spring meeting. At the spring meeting, the board will specifically discuss PEOs and recommend changes. The department forwarded the current PEOs in October of 2013 in preparation for the 2014 spring meeting. The department provided emails from board members with initial feedback.
 - b. The department has, on multiple occasions during annual Advisory Board meetings, received several requests for minor changes in the wording of PEOs

from the Advisory Board since 2013. All these requests for changes have been incorporated into the current PEOs.

2. The visiting team from ABET that came in October 2013 found one program weakness related to the assessment of student's ability to communicate effectively with a range of audiences for students in online classes only.
 - a. This was resolved and reclassified by ABET from a weakness to a concern. The department now requires faculty members who teach on-line to utilize one of two software packages that allow faculty to assess student's oral communication skills. The department will utilize the same rubric to assess oral communication in both online and on-ground sections. The response included a spring 2014 syllabus that shows the required utilization of these software packages to enable oral communication in on-line courses.

GENERAL CRITERIA

CRITERION 1. STUDENTS

A. Student Admissions

All interested students must apply to Lamar University and satisfy the University admission requirements. Students can indicate at the time of the initial application their interest in the computer science program, or they may declare their interest at any time thereafter. Students who are already admitted and wish to declare computer science as their major must first go to the University Records Office and fill out a “Declaration/Change of Major” form. Once this form is completed, or if the student indicated his/her desire to be in the computer science program upon admission, the student is automatically considered to be a computer science student. There is no other specific procedure for admission into the undergraduate computer science program.

All prospective Lamar University students who apply to the Lamar University should do so online using the statewide “Apply Texas” system. Incoming students submit a complete high school transcript or GED score, transcripts of previous college work where more than 18 hours of college credit was earned as well as ACT or SAT scores. This requirement also applies to students with high school dual credit. To qualify for unconditional admission, a student’s high school coursework must include: four units of English, three units of math, two units of laboratory sciences, 2 ½ units of social sciences, and 2 ½ credits in college preparatory electives (preferably 2 of those units in coursework related to a foreign language), satisfy the State of Texas Uniform Admission Policy, and graduate in the top 10 percent of their high school class or achieve a minimum composite score on the SAT or ACT exam. Students who are lacking in the course requirements may be admitted at the University’s discretion, with a variety of additional enrollment conditions that are imposed to improve opportunities for success at Lamar University. During registration for classes, students accepted through Individual Approval will meet with an advisor who will explain the guidelines, agreements and requirements necessary for enrolling at Lamar University.

New students should also attend an orientation in the semester before enrolling. Before orientation, the students should take a Texas Success Initiative (TSI) assessment test to demonstrate readiness for college-level courses. More information on Admissions can be found at the Lamar website.

B. Evaluating Student Performance

Students are evaluated based on their performance on tests, quizzes, lab and programming assignments, and written assignments such as essays and research papers. Every course does not necessarily use all these types of assessment items. Students enrolled in COSC 4272 (Senior Seminar) also take the Educational Testing Service (ETS) Computer Science Major

Field Test. This test is given to graduating seniors, but the scores are used only for assessment of the programs, not for individual grades.

When students first enter the program, they are advised by the department's designated advisor. Upon making enough progress toward their degree (generally upon completion of COSC 2336 (CS 3: Data Structures) and obtaining at least 60 semester credit hours), they are assigned a permanent faculty advisor. The University has an online system for students to enroll in courses. Students cannot use the system until their advisor removes the student's advisement hold. The advisor makes sure that students are meeting prerequisites. In addition, the online system will not allow students to register for courses unless the student has successfully completed the corresponding prerequisites. Under extenuating circumstances (e.g., a transfer student with good grades), students may be allowed to take a course normally considered a prerequisite as a co-requisite. This requires approval by the student's advisor or department chair. If a student has not met the prerequisite for a course and a mistake was made by the online system or human error, the instructor of record may ask the student to drop the course.

Majors are expected to be successful in their chosen discipline. Students who have attempted at least twelve hours of computer science courses and whose grade point average (GPA) in such courses drops below 2.00 (on a 4.0 scale) will be advised by Student Advising and Retention Services (STARS). These students will be advised by the STARS until their GPA increases above 2.0. Students receiving a B.S. in Computer Science are required to have an overall GPA of at least 2.25 and a GPA of at least 2.25 for all courses required for successful completion of the degree program.

No freshman student can take any senior-level computer science course that is an approved course for the B.S. in Computer Science degree. A student may not register for the same class more than four times. If a student is registered on the first class day, the course will appear on the student's transcript. Even if the student later drops the course or withdraws from school for that semester (receiving a "Q", or "W" for that course), the course counts as one attempt.

Lamar University has a grade replacement policy which allows students to replace an undergraduate course grade by repeating a course. If a student repeats a course, the official grade is the higher one, although all grades remain on the transcript. Eligibility for university honors is determined based on a cumulative GPA that includes those grades that were replaced. Repeating a course after taking a more advanced class in the same subject is not permitted. Once a degree has been conferred, a student may not replace a grade for any course that was used to award the degree or calculate the cumulative grade point average.

C. Transfer Students and Transfer Courses

Transfer Applicants with Fewer than 18 Credit Hours

Undergraduate students who are transferring with fewer than 18 credit hours of college-level coursework must also satisfy admission requirements for entering freshmen including a

satisfactory high school transcript. They submit an online application through the statewide “Apply Texas” system. They should have official copies of all prior college and university transcripts sent to Lamar regardless of the length of attendance and whether credit was earned. Students transferring with fewer than 18 credit hours also should have SAT or ACT test scores sent to the University.

Transfer applicants who have been academically dismissed from the last institution they attended but meet the GPA requirements listed above are not considered for admission until at least one regular semester (fall or spring) has elapsed. After this period, these applicants must submit a new application.

Students who meet the high school requirements but do not have a 2.00 GPA on attempted college coursework may be considered for admission. These applicants are reviewed by the office of Student Advising and Retention Services. Students’ major, types of courses taken, and pattern of progress, as well as high school records and standardized test scores, are considered in the admissions process.

Transfer Applicants with 18 Credit Hours or More

Students who are transferring with 18 or more credit hours of college-level coursework must meet the following requirement: Have earned an overall combined 2.00 GPA (as computed by Lamar University) on all transfer hours attempted and be eligible to re-enter all colleges and universities previously attended. Students who have failed any college readiness coursework are not eligible for admission until they have completed these courses with a passing grade.

Students who do not meet the requirement above can be considered for admission at the discretion of the University on an individual basis. These applicants write a one- to two- page statement in which they account for past academic shortcomings, suggest steps they will make to address those weaknesses, and specify the academic goals they plan to achieve while studying at Lamar University. Students may also include letters of recommendation from people familiar with their academic background and pertinent information such as participation in extra-curricular activities or specialized skills.

The Admissions Office evaluates transfer students’ transcripts to determine transfer credit for the general education requirements and some lower-division courses. The Department’s designated advisor, Dr. Bo Sun, checks transfer students’ syllabi and grades to determine transfer credit for most major courses.

Currently there are no state-mandated articulation requirements impacting transfer students. We do have articulation agreements with Lamar State-Orange and Lee College.

Transfer students can use an online credit evaluation tool to determine how completed coursework will be counted towards a degree at Lamar. The tool is also used by students and advisors to track a student’s progress toward fulfilling graduation requirements (see Figure 1-3,

1-4, 1-5 and 1-6). Credit earned at other accredited institutions is judged for Lamar University credit using the following guidelines:

1. All courses are used to calculate the transfer GPA, which is used to determine admission status.
2. Grades of D are transferable, but departments may refuse to accept the grades toward a degree.
3. Transfers from a two-year college are limited to 66 semester hours of transferable credit. No two-year college credits will be accepted for junior-senior credits.
4. Transfer students can expect to be informed of the amount of transfer credit awarded within two weeks of acceptance. In some circumstances, evaluation may take a longer time, but it must be completed by the end of the student's first academic semester at Lamar University.

More information on procedures for Transfer students can be found on the Lamar website.

D. Advising and Career Guidance

All new students go through an orientation process either as a part of the University's New Student Orientation sessions or with the Department upon their arrival. During this orientation process, students are walked through all degree requirements and are told how to obtain further information. Each new student is also given an information packet that includes a summary of all the degree requirements. Initially, all incoming students (new or transfer) are advised by the Department's designated advisor, Dr. Bo Sun, and by the Undergraduate Advising Center. A schedule for the Fall 2019 University Communication Advising Plan is shown in Appendix L-2. The Undergraduate Advising Center is responsible for the initial orientation process, and its services are available at any time for incoming students who have questions or need extra assistance in making the transition from high school. Services available include time management and tutoring. Students with poor academic backgrounds must sign an agreement and take a university-approved one credit hour course to improve their study habits. Appendix L provides information about the Undergraduate Advising Center.

The university Undergraduate Advising Center advises all majors in computer science during the first two years in which the student is accepted as a major. A permanent faculty mentor/advisor is assigned to the student upon completion of COSC 2336 (Computing Fundamentals III: Data Structures and completion of 60 semester credit hours). The faculty mentor then handles advising duties for the student for the rest of his or her academic career at the university. A form is filled out at each advising session and signed by the advisor and the student. (see Figure 1-1, an example advising form). All advisors are available year-round to mentor and guide students. When the student is ready to apply for graduation, Dr. Bo Sun checks over the degree plan to ensure that all requirements have been met. He then submits a degree plan for the student to the Graduation Officer in the Office of the Registrar. Students take COSC 4272 (Senior Seminar) during their last semester, which makes it easy

to communicate with seniors planning on graduation. A flowchart for the Advisement Procedures in the Department of Computer Science is shown in Figure 1-2.

**Department of Computer Science
Undergraduate Advisement Form**

YEAR/SEMESTER: Spring 2019 Summer I _____ Summer II _____ Summer III _____ Fall _____

Bachelor: Computer Science: ☒ CIS: _____ Game Development: _____ Data Analytics: _____

Game Development Concentration: _____ Bioinformatic Concentration: _____ Online Only: ☒

GPA: 4.0 Student's ID#: L [REDACTED]

Student's: [REDACTED] [REDACTED]
Last Name First Name

Phone: [REDACTED] Lamar Email: [REDACTED]

CRN Number	COSC or CPSC	Course Number	Section	Faculty	Name of Course
11002	COSC	2375	48F	Osborne	Discrete Structures
11993	COSC	2336	48E	Heerschulc	Programming Fundamentals III
11712	COSC	3302	48F	Koh	Intro to Computer Theory
13714	MATH	2414	48F	White	Calculus II

Graduating: May _____
August _____
December _____

11-7-18
Advisement Date

12-17-18
Agreement Date

Ro [Signature]
Adviser Signature

[Signature]
Student Signature

OFFICE USE ONLY:	OFFICE USE ONLY:
HOLD(S):	NEW HOLD DATE: 3/1/19
HOLD RELEASED:	
EMAILED STUDENT:	

Figure 1-1. Example Undergraduate Computer Science Advising Form

The University has an online degree audit tool called Degree Works that supports advising (see Figure 1-3, 1-4, 1-5 and 1-6). The tool lists the outstanding courses that a student needs to graduate. Courses are subdivided into the categories of General Education requirements, College of Arts and Sciences requirements, and Computer Science major requirements. Both advisors and students may access Degree Works from any Internet-connected computer.

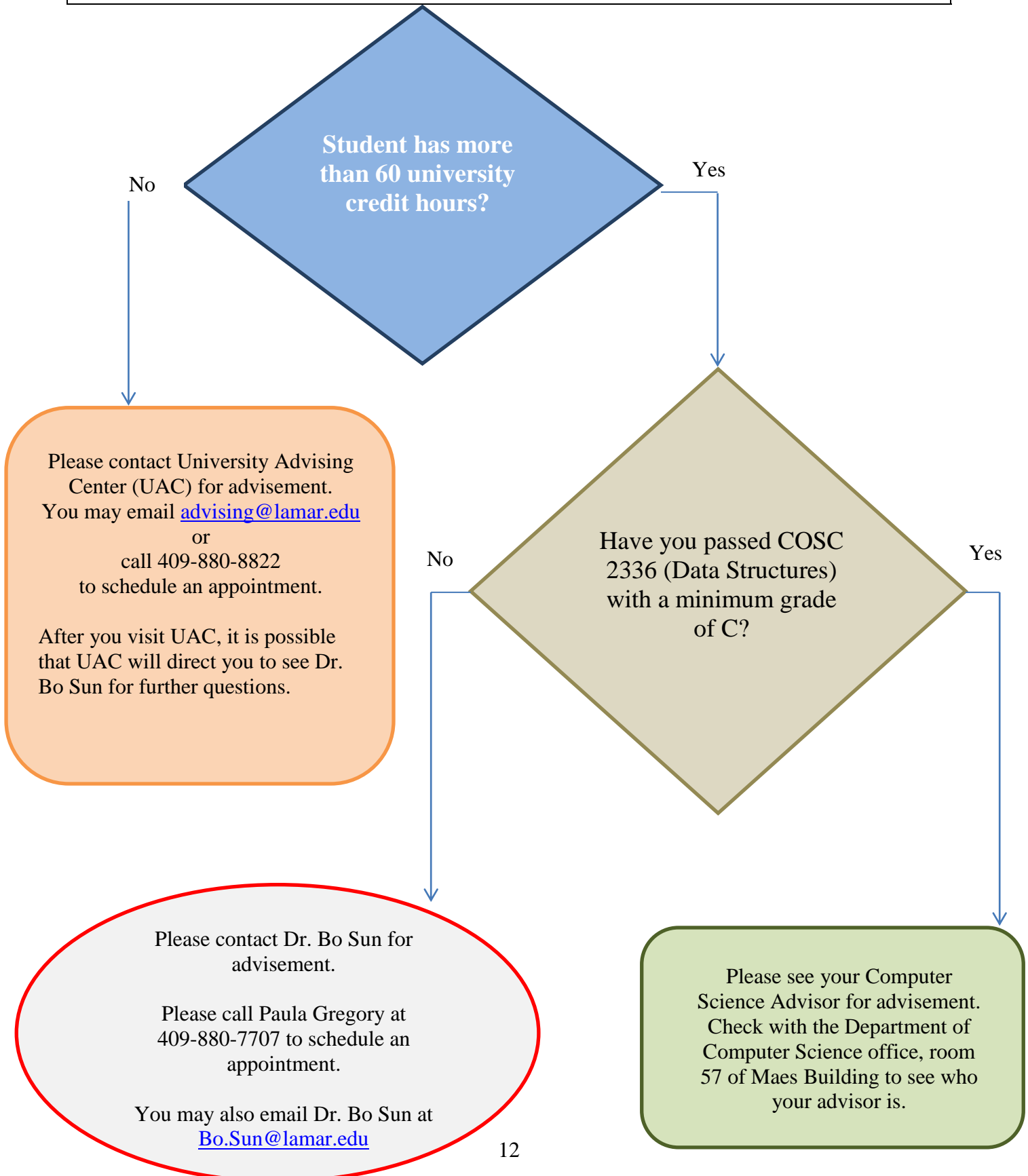
Towards the end of every semester, students are required to contact their advisor to review which courses they need to take the next semester. During this time, advisors ensure that students are on the right track for graduation, advise them on how to best complete the requirements given the upcoming course offerings, and inform students of any upcoming changes that may affect their ability to complete the degree. Unless students contact the advisor assigned to them, they are unable to register for classes. The Department's designated advisors are available for backup in case the student's advisor of record is unavailable. In addition, students have access to the University's online undergraduate catalog and online unofficial transcripts and a departmentally produced master checklist for the degree. These items allow students to easily keep track of where they are in the program, allowing them to perform some measure of self-advising.

E. Work in Lieu of Courses

If a student requests credit for work experiences in lieu of enrolling in a class, the student must pass a credit exam in the course for which they wish to receive credit. An exception to this rule is if the student has taken the Advanced Placement Test in computer science. Credit is given according to the rules given below to those students who have completed an advanced placement test in computer science.

<u>Test</u>	<u>Score</u>	<u>Courses for which Credit Is Assigned</u>
Computer Science A test	4 or 5	COSC 1336
Computer Science AB test	4 or 5	COSC 1336, COSC 1337

Figure 1-2. Advisement Procedure for Students



F. Graduation Requirements

The name of the degree offered by the Department of Computer Science is the Bachelor of Science in Computer Science. To obtain the degree, a student must successfully complete 121 semester hours of credit. There are two categories of requirements that students must complete: Core Curriculum requirements and Computer Science major requirements. The Core Curriculum requirements in Mathematics and Science are satisfied by Computer Science major requirements. These requirements are summarized below.

Core Curriculum

- **English Composition**—six semester hours from ENGL 1301, 1360 (Honors), 1302, 1361 (Honors) or 1374
- **Language, Philosophy and Culture**—three semester hours.
- **Communication or Modern Language**—three semester hours from COMM 1315, 1360 (Honors), 1321, FREN 1311, SPAN 1311 or DSDE 1371.
- **American History**—six semester hours from HIST 1301, 1302, 1361 (Honors), 1362 (Honors), 2301
- **Creative Arts**—three semester hours from ARTS 1301, ARTS 1303, DANC 2304, PHIL 1330, MUSI 1306, or COMM 1375.
- **Social Science** – three semester hours from ECON 1301, 2301, 2302, PSYC 2301, SOCI 1301, BULW 1370, or COMM 1375.
- **Political Science**—six semester hours: POLS 2301 and 2302
- **Mathematical Science**—Six to seven semester hours at or above MATH 1314 or 1414 and three to four semester hours in mathematics (at or above the content level of trigonometry, MATH 1316) or quantitative analysis (BUAL 3310, MATH 1342, MATH 3370 or PSYC 2471).
- **Laboratory Sciences**—eight semester hours from BIOL 1406, 1407, 1408, 1409, 2401, 2402, CHEM 1406, 1408, 1311/1111, 1312/1112, 1460 (Honors), GEOL 1403, 1404, PHYS 1401, 1402, 1405, 1407, 1411, 2425, 2426.

Computer Science Major

- **Mathematics (20-21 hours)** — MATH 2413, MATH 2414, MATH 2318, MATH 3370, MATH 3322 or MATH 2415, and COSC 2375.
- **Laboratory Sciences (12 hours)** — Three lecture/lab courses from the collection PHYS 2425, PHYS 2426, CHEM 1311/1111, CHEM 1312/1112, BIOL 1406, AND BIOL 1407.


- **Computer Science (56 hours)** – COSC 1172, 1173, 1174, 1336, 1337, 2336, 2372, 3302, 3304, 3308, 3325, 4272, 4302, 4310, CPSC 4317, 4340, 4360, and four COSC/CPSC/ELEN electives

Academic electives are used to complete the 121 semester hours. In addition, seniors are required to take the ETS Computer Science Major Field Test the same semester that they take COSC 4272. More information about the Core Curriculum can be found on the Lamar website. According to the University Catalog, “students who transfer to Lamar University from another Texas public institution of higher education shall be governed by the provisions of Texas Senate Bill 148 (75th Legislature). Lamar will accept, *en bloc*, an approved core curriculum successfully completed at another Texas public institution of higher education in lieu of Lamar’s core curriculum. Any student who transfers to Lamar University before completing the core curriculum of another Texas public institution of higher education shall receive academic credit at Lamar for each of the courses that the student has successfully completed in the core curriculum of the other institution; however, the student shall be required to complete Lamar’s core curriculum. Students transferring to Lamar from institutions of higher education outside of Texas or from private institutions within Texas shall be subject to the requirements of Lamar University’s core curriculum.”

All students who wish to graduate have a University procedure to follow which helps ensure that all requirements have been met. Students and advisors can access the online DegreeWorks tool at any time to check which courses have been completed successfully and which courses are remaining. Once a student (with assistance from the student’s advisor) determines they are close to graduating, the student submits an “Application to Graduate” form to the Registrar’s Office indicating the expected graduation semester. The University then reviews the student’s records and completes a “Summary of Coursework Remaining” that is then mailed to the student. This summary is the University’s official listing of what requirements the student has left to complete for the degree. If there are any inaccuracies or questions about the remaining requirements, Dr. Bo Sun acts as an interface between the student and the University. Once the advisor is certain that the student understands the remaining requirements, both the advisor and the student sign the Degree Plan, which is then returned (by the student) to the University.

From this point forward, the University monitors the student’s courses. If the student does not sign up for all remaining classes and/or does not complete all requirements during the final semester (as listed on the Degree Plan), the University mails the student a letter. The student must immediately register for the remaining courses and handle any other remaining requirements or risk not graduating that semester.

If at any time there are changes made to either the Degree Plan or the Summary of Coursework Remaining, it is the responsibility of the party making the change to inform the other interested parties as soon as possible. This includes (but is not limited to) the student transferring in additional courses from outside the University, the advisor agreeing to a change in the requirements for the student, and the University uncovering a discrepancy in the remaining requirements.


LAMAR UNIVERSITY

Degree Audit Report

Lamar University

Student View
as of 06/18/2019 at 09:40 AM
SUMMER 2019 (Graduation check)

Student		School	Undergraduate
ID		Degree	Bachelor of Science
Level		College	College of Arts and Sciences
Academic Standing		Major	Computer Science COSC
Overall GPA	3.955	Minor	
6 Drop Status	0 Drop(s)	Concentration	
TSI Status	EI - Exempt at previous TX Public		

Degree Progress

Requirements 98%

 **Degree in Bachelor of Science**

Catalog Year: 2016-2017
 Credits Required: 121
 GPA: 3.953
 Credits Applied: 122

✓

Only 30 developmental credits are allowed. Reason:

A minimum of 24 hours must be complete at Lamar University as a senior.

✓

Graduation Application Received

Remark: Your audit has been submitted for review by the Graduation Department.

✓

General Education Core Curriculum


Track 2 from General Education Core Curriculum

College Requirements

✓

Major Requirements

You meet the minimum GPA requirement

 **Graduation Application Process**

Catalog Year: 2016-2017
 GPA: 0.000

Click [here](#) to visit Lamar University's Commencement page. In order for your degree to be awarded, ALL coursework must be successfully completed and all outstanding requirements met.

✓

Thank you for applying for graduation

✓

Records audit review

✓

Advisor audit review


Remark: If you are required to schedule an Exit Interview in your last semester and have not completed it, your application will be on hold until your advisor has notified Records that you have been cleared.

✓

Additional Department audit review complete - if applicable

✓

Graduation application accepted-Congratulations

 **General Education Core Curriculum**

Catalog Year: 2016-2017
 Credits Required: 36
 GPA: 4.000
 Credits Applied: 36

	HIST 1301	U S HIST I	TS	3	Fall 2016	
✓	History	Satisfied by	HIST1301 - HIST OF US I - CLEP			
		HIST 1302	U S HISTORY II SINCE 1877	TA	3	Fall 2016
		Satisfied by	HIST1302 - US HIST II - Austin Community College			


Figure 1-3. Student Degree Audit Report (Page 1 of 4).

LAMAR UNIVERSITY						
Degree Audit Report						
	Communication I - Min Grade C	ENGL 1301	Composition I	INPR	(3)	Summer 2019
	Communication II	COMM 1321	Business and Prof Speech	A	3	May Min 2019
	Creative Arts	ARTS 1301	Art Appreciation	A	3	Fall 2016
	Political Science	POLS 2301	AMERICAN GOVT I	TA	3	Fall 2016
		Satisfied by	GOVT2306 - TX & LOCAL GOV - Austin Community College			
		POLS 2302	AMERICAN GOVT II	TA	3	Fall 2016
	Language, Philosophy, & Culture	Satisfied by	GOVT2305 - US GOVERNMENT - Austin Community College			
		PHIL 1370	PHILOSOPHY OF KNOWLEDGE	TA	3	Fall 2016
	General Biology OR University Physics	Satisfied by	PHIL1301 - INTRO TO PHILOSOPHY - Austin Community College			
		CHEM 1311	General Chemistry I	A	3	Fall 2016
	Calculus & Analytical Geometry I	CHEM 1312	General Chemistry II	A	3	Fall 2017
		MATH 2413	Calculus & Analytical Geom I	A	3	Summer 2017
	Social/Behavioral Science	PSYC 2301	GENERAL PSYC	TA	3	Fall 2016
		Satisfied by	PSYC2301 - GENERAL PSYCHOLOGY - Texas State Technica College			
	Track 2 from General Education Core Curriculum		Catalog Year:	2016-2017	Credits Required:	6
			GPA:	3.000	Credits Applied:	7
	English Composition II	TRNS 1000	SLNG 1404 AMER SGN LNG I	TA	4	Fall 2016
		Satisfied by	SLNG1404 - AMER SGN LNG I - Austin Community College			
			Remark: If a student is CORE COMPLETE, courses with the attribute 090, 091, 092 090N may replace course work found in Track 2.			
Exception By: Pieri, Mildred P on 09/09/2016			Apply Here : Core 090N at ACC			
	Calculus & Analytical Geometry II	MATH 2414	Calculus & Analytical Geom II	B	3	Spring 2017
	College Requirements		Catalog Year:	2016-2017	Credits Required:	4
			GPA:	3.750	Credits Applied:	4
COLLEGE OF ARTS AND SCIENCES REQUIRES 2 ADDITIONAL LAB SCIENCES CREDITS AND THE DEPARTMENT REQUIRES 1-2 ADDITIONAL MATH CREDITS.						
	LAB SCIENCE	CHEM 1112	General Chemistry II Lab	A	1	Fall 2017
	LAB SCIENCE	CHEM 1111	General Chemistry I Laboratory	A	1	Fall 2016
	Additional Math Credit	MATH 2413	Calculus & Analytical Geom I	A	1	Summer 2017
	Additional Math Credit	MATH 2414	Calculus & Analytical Geom II	B	1	Spring 2017
	Major in Computer Science		Catalog Year:	2016-2017	Credits Required:	75
			GPA:	4.000	Credits Applied:	76
	MATH & SCIENCE REQUIREMENTS					
	Additional Lab Science credits	PHYS 2425	Univ Physics I	TA	4	Spring 2019
		Satisfied by	PHYS2425 - UNIVERSITY PHYSICS I - Western Texas College			
	Linear Algebra	MATH 3328	Linear Algebra I	A	3	Spring 2017
	Intro to Theory of Statistical Inference	MATH 3370	Intro Theory Statistical Infer	A	3	Spring 2019
	Intro Advanced Mathematics OR Calculus III	MATH 2415	Calculus III	A	4	Fall 2018
	COMPUTER SCIENCE COURSEWORK					

Figure 1-4. Student Degree Audit Report (Page 2 of 4).

LAMAR UNIVERSITY				Degree Audit Report		
✓	Fundamental I	COSC 1336	Fundamentals I	A	3	Fall 2016
✓	Programming Lab I	COSC 1173	CS I Lab	A	1	Fall 2016
✓	Think, Speak, Write	COSC 1172	Think, Speak, Write	A	1	Fall 2016
✓	Fundamental II	COSC 1337	Fundamentals II	A	3	Spring 2017
✓	Programming Lab II	COSC 1174	CS II Lab	A	1	Spring 2017
✓	Discrete Structures	COSC 2375	Discrete Structures	A	3	Spring 2017
✓	Fundamental III: Data Structures	COSC 2336	Programming Fundamentals III	A	3	Spring 2017
✓	Computer Assembly & Organization	COSC 2372	Computer Org/Assembly Language	A	3	Fall 2018
✓	Algorithm Design & Analysis	COSC 3304	Algorithms Design and Analysis	A	3	Spring 2019
✓	Networks	CPSC 4317	Computer Networks	A	3	Summer 2017
Exception By: Sun, Bo on 08/31/2018		Apply Here : Approved Substitution, per Dr. Sun				
✓	Programming Language	COSC 3308	Design Programming Languages	A	3	Fall 2017
✓	Computer Law & Ethics	COSC 3325	Computer Law/Ethics	A	3	Fall 2018
✓	Intro to Computer Theory	COSC 3302	Intro to Computer Theory	A	3	Spring 2019
✓	Database Design	CPSC 4340	Database Design	A	3	Fall 2017
✓	Operating Systems	COSC 4302	Operating Systems	A	3	Summer 2017
✓	Software Engineering	CPSC 4360	Software Engineering	A	3	Spring 2019
✓	Intro to Computer Architecture	COSC 4310	Computer Architecture	A	3	Fall 2018
📁	Senior Assessment	COSC 4272	Senior Assessment	INPR	(2)	Summer 2019
📁	CHOOSE STD. OR GAME DEVELOPMENT CONCENTRATION					
📁	STANDARD COMPUTER SCIENCE PLAN					
		COSC 4301	Data Mining	A	3	Summer 2017
✓	COSC/CPSC/ELEN Upper-Level Elective	COSC 4301	Data Warehousing Design	A	3	Fall 2017
		COSC 4301	Secure Software Engineering	A	3	Fall 2017
📁	Computer Science Elective	CPSC 4363	Cyber Security	INPR	(3)	Summer 2019
Exception By: Sun, Bo on 05/14/2019		Apply Here : Approved Substitution, per Dr. Sun				
✓	Academic Elective	PSYC 2315	LIFESPAN DEV	TA	3	Fall 2016
Exception By: Sun, Bo on 03/27/2019		Satisfied by: PSYC2314 - HUMAN GROW/DEV - Austin Community College Apply Here : Approved Substitution				
Additional Courses						
MATH 2312	Precalculus II	A	3	Fall 2016		
MATH 2414	Calculus & Analytical Geom II	B	1	Spring 2017		
PSYC 2301	GENERAL PSYC	TC	3	Fall 2016		
Satisfied by: PSYC2301 - GENERAL PSYCHOLOGY - Texas State Technical College						
SOCI 1301	INTRO TO SOCIOLOGY	TA	3	Fall 2016		
Satisfied by: SOCI1301 - INTRODUCTION TO SOCIOLOGY - Austin Community College						
Insufficient						
COMM 1315	Public Speaking I	W	3	Win Min 2017		
COSC 3325	Computer Law/Ethics	F	0	Spring 2018		

Figure 1-5. Student Degree Audit Report (Page 3 of 4).



LAMAR UNIVERSITY

Degree Audit Report

MATH 3370	Intro Theory Statistical Infer	F	0	Spring 2018	
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In-progress

COSC 4272	Senior Assessment	INPR	2	Summer 2019	
CPSC 4363	Cyber Security	INPR	3	Summer 2019	
ENGL 1301	Composition I	INPR	3	Summer 2019	


Exceptions

Type	Description	Date	Who	Block	Enforced
Apply Here	Core 090N at ACC	09/09/2016	Piert, Mildred P	RA000425	Yes
Apply Here	Approved Substitution, per Dr. Sun	08/31/2018	Sun, Bo	RA000516	Yes
Apply Here	Approved Substitution	03/27/2019	Sun, Bo	RA000516	Yes
Apply Here	Approved Substitution, per Dr. Sun	05/14/2019	Sun, Bo	RA000516	Yes

Legend




Complete




Complete except for classes in-progress

(T)

Transfer Class



Not Complete



Nearly complete - see advisor

@

Any course number

Disclaimer

You are responsible for completing your own degree requirements. This degree audit report, which we encourage you to use, is provided to you as a guide only when planning your progress toward completion of the above requirements. Your academic advisor or the Registrar's Office may be contacted for assistance in interpreting this report. This audit is not your academic transcript and it is not official notification of completion of degree or certificate requirements. Please contact the Registrar's Office regarding this degree audit report, your official degree/certificate completion status, or to obtain a copy of your academic transcript

Figure 1-6. Student Degree Audit Report (Page 4 of 4).

CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES

A. Mission Statement

University

Lamar University is dedicated to student success by engaging and empowering students with the skills and knowledge to thrive in their personal lives and chosen fields of endeavor. As a doctoral granting institution, Lamar University is internationally recognized for its high-quality academics, innovative curriculum, diverse student population, accessibility, student success, and leading-edge scholarly activities contributing to transforming the communities of Southeast Texas and beyond.

College

The College collectively involves students in an academic experience of the highest quality based on the following principles:

- To provide an excellent learning environment wherein all students may refine the knowledge and skills essential to cultivate their ability to think critically, communicate effectively, and advance their appreciation of artistic and scientific inquiry;
- To provide a contemporary education through the integration of information technology into the study of disciplines traditionally associated with the arts and sciences; and
- To stress the importance of lifelong learning through community outreach, service, research and creative endeavors.

B. Program Educational Objectives

Program Objectives

Published on the Department of Computer Science website:

Within a few years of graduation, graduates of the computer science program will achieve the following:

1. Graduates of the Computer Science Program will develop the professional skills and the necessary technical knowledge both in breadth and in depth to prepare them for employment and advanced study in Computer Science.
 - Implementation: using Student Outcomes 1, 2 and 6
 - Measurement: using Curriculum Outcomes 1, 2 and 3.
2. Graduates of the Computer Science Program will have sufficient awareness of the local and global societal impact of technology and of the related legal and ethical issues in computer science to make decisions regarding their personal and professional responsibilities.
 - Implementation: using Student Outcome 4
 - Measurement: using Curriculum Outcomes 4 and 5.
3. Graduates of the Computer Science Program will have the critical thinking, communication, teamwork, and leadership skills necessary to function productively and professionally.

- Implementation: using Student Outcomes 3 and 5
 - Measurement: using Curriculum Outcomes 6, 7 and 8.
4. Graduates of the Computer Science Program will be able to demonstrate intellectual curiosity and the independent study skills necessary for life-long learning.
- Implementation: using Student Outcome 7
 - Measurement: using Curriculum Outcome 9.

Student Learning Outcomes

See Criterion 3. Student Outcomes

C. Consistency of the Program Educational Objectives with the Mission of the Institution

The educational objectives of the Department of Computer Science align with the Lamar University Mission and the College of Arts and Sciences Mission statements since the Department of Computer Science seeks to produce graduates who can thrive and be productive in careers in the Computing Sciences and who embrace and excel at lifelong learning. Our program provides students both theoretical and practical foundations needed to be successful. Through classroom and lab activities, opportunities for research, and early involvement in professional organizations, including programming competitions, the Department of Computer Science seeks to educate a well-rounded computing professional capable of independent thinking.

D. Program Constituencies

The program constituencies are students, faculty, staff, and industry partners.

The educational objectives meet the needs of students by providing them with the opportunities necessary to advance their skills to the point they can find a job in computing upon graduation from the program. Alternatively, the program also prepares students for graduate study in computer-related disciplines.

The educational objectives meet the needs of faculty by providing opportunities for faculty to impart their knowledge of computing and advance their careers in academia. In addition, for faculty interested in research, the program offers students opportunities to engage with faculty in faculty-sponsored research.

The educational objectives are enhanced by the work of staff since all students need to interact with staff members on academic issues, such as maintaining the grade records, advisement records, preparing the payment for all undergraduate and graduate assistants, and more administrative tasks.

The educational objectives meet the needs of industry partners since graduates of the program are well prepared to enter the workforce. Since the program receives and evaluates continual feedback from industry partners, the program is kept up-to-date with and responds to industry needs.

E. Process for Review of the Program Educational Objectives

Undergraduate Curriculum Committee

The Undergraduate Curriculum Committee meets regularly each academic year to review how various components of the program continue to meet the educational objectives of the program. These include review and adoptions of textbooks, proposals for the deletion or addition of courses to the program, and student feedback.

Assessment Committee

The Assessment Committee meets regularly each academic year. The committee reviews proposals for changes to the assessment procedures for the program based on feedback from students and instructors. The committee also reviews feedback from other sources included, but not limited to the program Advisory Board, other University departments and University administration. As the content of some courses may change or evolve over time, the committee makes sure the assessment procedures for each course are aligned with the educational objectives of the program. At the end of each academic year, the committee reviews assessment data gathered for the program and decides on changes, if any. For this reason, the committee is one of the most important venues for changes that ensure continuous program improvement.

Advisory Board

The program has an Advisory Board consisting of representatives of local, regional, and national companies. Many of the Advisory Board members are Alumni of Lamar University. Each spring the Advisory Board meets for a one-day conference on the Lamar campus. Faculty members, including the Chair of the program, make presentations to highlight important changes in the program such as new facilities, new courses, and progress on research grants or new faculty members hired. The Advisory Board provides feedback to the Department Chair on the state of the program and any recommended changes. The Chair is responsible for presenting any significant feedback from the Advisory Board to the full faculty of the Department. If feedback from the Advisory Board is related to the educational objectives of the program, the Chair is responsible for moving any recommendations to the appropriate Department committees for further consideration and possible action.

All recommendations and proposed changes by the above committees are presented to the faculty and are subject to vote.

CRITERION 3. STUDENT OUTCOMES

A. Student Outcomes

Published on the Department of Computer Science website:

1. Graduates of the program will have an ability to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Graduates of the program will have an ability to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Graduates of the program will have an ability to communicate effectively in a variety of professional contexts.
4. Graduates of the program will have an ability to recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Graduates of the program will have an ability to function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Graduates of the program will have an ability to apply computer science theory and software development fundamentals to produce computing-based solutions.
7. Graduates of the program will have an ability to independently acquire new computing related skills and knowledge to pursue either further formal or informal learning after graduation.

A.1 Curriculum Outcomes

Curriculum Outcomes are derived from Student Outcomes and more closely correspond with the material in courses. Both Student Outcomes and Curriculum Outcomes describe abilities and knowledge that graduates of the program will have. Student Outcomes are more general while Curriculum Outcomes are more specific and are measured in specific courses.

Published on the Department of Computer Science website:

1. Software Fundamentals: Graduates will demonstrate their ability to use fundamental computer science knowledge to design, document, implement, and test software solutions to a wide range of problems, using at least two high-level programming languages.
2. Computer Science Technology Skills: Graduates will demonstrate expertise in the main content areas of computer science including.
 - Discrete and continuous mathematics including skills in logic and proof writing
 - Analysis and design of algorithms
 - Formal languages and computability theory

- Operating systems
 - Database systems
 - Computer architecture
 - Computer networks and distributed computing concepts
3. Scientific Method: Graduates will be able to gather requirements, analyze, design and conduct simulations or other computer experiments and evaluate and interpret the data generated.
 4. Societal Awareness: Graduates will be aware of and understand the impact of computer technology on society at large, on the workplace environment, and on individuals.
 5. Ethical Standards: Graduates will be able to recognize and understand the importance of ethical standards as well as their own responsibilities with respect to the computer profession.
 6. Collaborative Work Skills: Graduates will demonstrate the ability to work effectively in teams to conduct technical work through the exercise of interpersonal communication skills.
 7. Oral Communication Skills: Graduates will demonstrate their ability to communicate clearly.
 8. Written Communication Skills: Graduates will demonstrate their ability to write effectively both technical and non-technical materials with appropriate multimedia aids.
 9. Continuing Education and Lifelong Learning: Graduates will demonstrate that they can independently acquire new computing related skills and knowledge in order to pursue either further formal or informal learning after graduation.

A.2 Relationship of Student Outcomes, Program Educational Objectives and Curriculum Outcomes

The 7 Student Outcomes are mapped to the 9 Curriculum Outcomes in Table 3-1. Also shown is the mapping of Student Outcomes to Program Education Objectives. The three can be viewed in a hierarchy with Program Education Objectives at the top of the hierarchy, Student Outcomes are below at the next level and finally, Curriculum Outcomes below the Student Outcomes (for illustration see Table 4-1). The 9 Curriculum Outcomes are mapped to performance criteria in one or more required courses in the program as shown in the Curriculum Map in Appendix H.

Table 3-1 illustrates the relationship between Student Outcomes, Curriculum Outcomes and Program Educational Objectives.

Table 3-1. Mapping of Student Outcomes to Program Educational Objectives (PEOs) and Curriculum Outcomes.

2019-2020 Student Outcomes	PEO	Curriculum Outcomes
(1) Graduates of the program will have an ability to analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	1	3
(2) Graduates of the program will have an ability to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	1	1,2
(3) Graduates of the program will have an ability to communicate effectively in a variety of professional contexts.	3	7,8
(4) Graduates of the program will have an ability to recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.	2	4,5
(5) Graduates of the program will have an ability to function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	3	6
(6) Graduates of the program will have an ability to apply computer science theory and software development fundamentals to product computing-based solutions.	1	1,2
(7) Graduates of the program will have an ability to independently acquire new computing related skills and knowledge to pursue either further formal or informal learning after graduation.	4	9

A.3 Process for the Establishment and Revision of the Student Outcomes

All course instructors who teach courses with outcomes tied to the program student learning outcomes assess and evaluate their courses each semester. This data is entered and archived on the department assessment website. At the end of the academic year the Assessment Committee reviews these data to see if changes are needed either to specific courses or to the outcomes themselves. In addition, instructors can suggest changes to course content, delivery methods or assigned student learning outcomes. The Assessment Committee reviews both annual data and ongoing instructor feedback. If changes are recommended by the committee, any such recommendations are sent to the full faculty for discussion and voting. See Appendix H for a chart showing which courses in the program are used to evaluate student learning outcomes.

B. Publication of Student Outcomes

The Student Outcomes are published on the department website. They are updated each year if needed as a result of any changes to the program assessment process.

CRITERION 4. CONTINUOUS IMPROVEMENT

The mission of the Bachelor of Science in Computer Science (BSCS) program is to provide graduates with the fundamental knowledge and habits of critical thinking required for future leadership roles in the numerous fields that depend on the underlying discipline of computer science. We intend to give each graduate a foundation in both the theory and the practice of computer science and to prepare each graduate to take advantage of opportunities for generating new knowledge after graduation. We intend to introduce each graduate to the challenges and joys involved in research that leads to new kinds of computer software and hardware. We intend to provide the knowledge and skills necessary to foster a commitment to lifelong learning and ethical behavior. The faculty believes the mission can only be accomplished through a commitment to assisting student learning through analysis and application, continuous improvement of the program through assessment and evaluation of student needs, and responsiveness to changes in the discipline within a global, social and ethical context.

Our process for regular assessment and evaluation is adopted from the ABET 2012 Symposium sample Self-Study Report from the Lebanese American University and follows the flow shown in Figure 4-1. Definitions of terms used in the flow chart are shown in Table 4-1. The definitions are consistent with similar terms in the ABET Self-Study Report Development Workshop manual (April 2019).

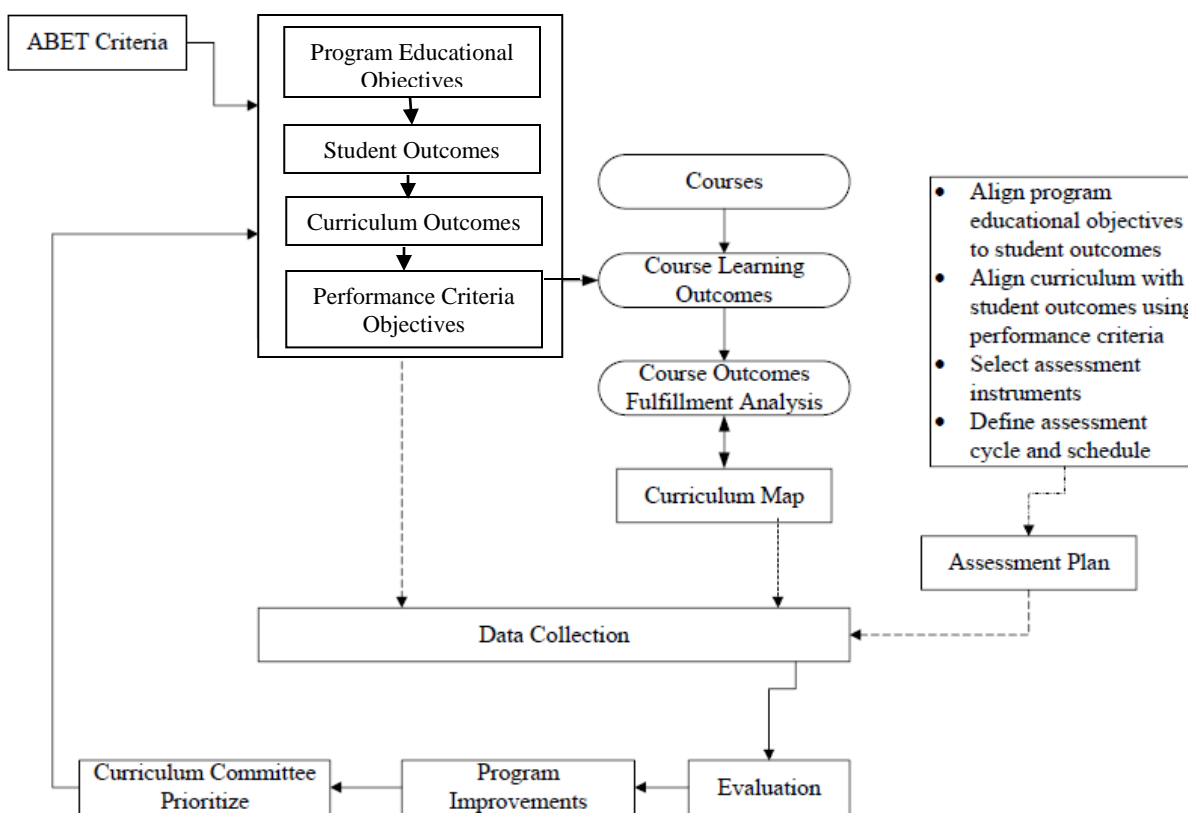


Figure 4-1. The Department's continuous improvement process.

Table 4-1. Definition of terms.

ABET Terms	Definitions
Program Educational Objectives	Broad statements that describe what graduates are expected to attain within a few years after graduation. They are based on the needs of the program's constituencies.
Student Outcomes	Student outcomes describe, in general, the abilities that graduates of the program should have.
Curriculum Outcomes	Student outcomes describe what students are expected to know and able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program. Curriculum Outcomes are more specific than Student Outcomes.
Performance Indicators	Specific, measurable statements articulating the key characteristics of the outcome. They enable faculty to "know it when they see it."
Assessment	Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes and program educational objectives. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the objective or outcome being measured. Appropriate sampling methods may be used as part of an assessment process.
Evaluation	Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes and program education objectives are being attained. Evaluation results in decisions and actions regarding program improvement.

A. Student Outcomes

Table 4-2 shows the frequency with which the assessment processes from Figure 4-1 are carried out, and the program constituents responsible for providing the feedback.

Table 4-2. Frequency of Assessment Data Collection.

Constituent Providing Feedback	Assessment Process	Frequency
Instructors	Student Performance in CS Courses on Program SLOs	Once per long semester
Students	Student Course Evaluations	Once per long semester
Students (graduating seniors)	Exit Interview	Once per year
Students (graduating seniors)	Exit Survey	Once per year
Alumni	Alumni Survey	Once per year

Advisory Board	Advisory Board Questionnaire	Once per year
Educational Testing Service (ETS)	Major Field Test	Once per long semester

Below we present each of the assessment processes listed in Table 4-2 in more detail, including:

- 1) How the data is collected;
- 2) Is the data direct or indirect;
- 3) What is the target level of attainment;
- 4) How the results are documented and maintained.

Student Performance in CS Courses on Program SLOs

This data is collected by instructors during the semester the course is taught and is a direct assessment of student learning outcomes. The procedure for assessment of student performance varies by outcome and by course and can include performance measurements from assignments, tests and rubrics. Those procedures are listed in Appendix E.1. Student performance data is only included in these assessments for students who successfully pass the course. For COSC 1336 and 1337 a grade of 'B' or better is required to pass the course. Otherwise, students are required to retake the course. For all other courses, a 'C' or better is required to pass a course. We take this approach because we want to assess the quality of performance for students who are at least minimally progressing through our program. For students below the minimal level of progression, we do not feel it is appropriate to include that data since it would not provide an accurate overall view of student performance for students who complete our program of study.

Our target for the level of attainment of student performance on course assessment instruments is 80% or better.

The results of these direct assessments are uploaded at the end of each semester on our internal Department assessment website. Also, each summer, an extensive annual ABET report is created (similar in scope to this self-study) and archived on the Department website. These annual assessment reports are available to the public.

Student Course Evaluations

This data is collected via an online submission system for evaluations administered by the University. This data is an indirect assessment of student learning outcomes. A common evaluation form is used for all computer science courses and is listed in Appendix F.1.

Our target for the level of attainment on student evaluations for each course is 3.75 or better on a 5.0 scale.

The results of these indirect assessments are sent to the Department Chair after the conclusion of each long semester via an email link that allows both the Department Chair and individual instructors to view the assessment data in a web-hosted environment. This online data is archived by the University and can be reviewed when needed. In addition, this data is

included in the Department Annual ABET Report. Data from this year is listed in Appendix G.3.

Exit Interview & Exit Survey

This data is collected in COSC 4272 and indirect assessments. A common form is used for both the Exit Interview and Exit Survey. The Exit Interview form is listed in Appendix F.2. The Exit Survey Form is listed in Appendix F.3.

See Appendix E.2 (Criteria for Satisfactory Performance) for a complete listing of the targets for level of attainment on the Exit Interview and Exit Survey.

Results are maintained by the Department secretary and a summary of the results are included in the Department Annual ABET Report. Data from this year is listed in Appendix G.4 (Exit Interview) and G.5 (Exit Survey).

Alumni Survey

This data is collected via U.S. mail and is an indirect assessment. A common form is used and is listed in Appendix F.4. The survey is typically sent to alumni who have graduated at least 3 years previous and not more than 8 years and who have not responded to another alumni survey.

See Appendix E.2 (Criteria for Satisfactory Performance) for a complete listing of the targets for level of attainment on the Alumni Survey.

Results are maintained by the Department secretary and a summary of the results are included in the Department Annual ABET Report. Data from this year is listed in Appendix G.6.

Advisory Board Questionnaire

This data is collected by providing Advisory Board members a paper copy of the questionnaire during the day-long Advisory Board meeting each spring. The questions and responses for this year are listed in Appendix G.7.

Since this data is neither a direct nor an indirect measure of the program, there is no specific level of attainment expected. The information gathered is used by the Department to better understand more fully the needs of these constituents. Thought-provoking ideas are relayed to the general faculty for discussion as appropriate.

Results of the questionnaire are included in this self-study, and we expect to continue to document these results in each annual ABET report.

Major Field Test

This data is an indirect measure of the program. The test and the contents of the test are administered by the Educational Testing Service (ETS).

See Appendix E.2 (Criteria for Satisfactory Performance) for a complete listing of the targets for level of attainment on the Major Field Test.

Results are maintained by the Department secretary and a summary of the results are included in the Department Annual ABET Report. Data from this year is listed in Appendix G.8.

B. Continuous Improvement

The process of gathering, archiving, assessing and summarizing the data used to continuously improve the program culminates in meetings of the Department Assessment Committee during the spring and summer semesters. See Appendix J for a complete list of meeting minutes of this committee during the recent academic year. Based on direct and indirect measures, the committee makes recommendations for improvement. These are summarized by outcome. There are 9 individual program curriculum outcomes. See Appendix G.1 for a complete list by outcome of the analysis of direct and indirect results from the most recent assessment cycle as well as recommendations for actions and second-cycle results, if any. The second-cycle results represent follow-up actions based on actions recommended during the previous year assessment.

Detailed analyses of the assessment and actions taken, by outcome, are included in each annual ABET report, including this report (Appendix G.1). Annual ABET reports are available publicly on the Lamar Computer Science Department website. Following are summaries of the most important actions taken to improve the program during each of the last five years.

Changes made in 2019

These changes will take effect in the 2019-2020 academic year.

1. We will ask the person responsible for administering course evaluations to revise question 39 since it was incorrectly worded on the course evaluations this year. The new wording will be “The knowledge of a firm theoretical...”. What was missing from the question was “The knowledge of a” and so the question appeared unclear.
2. We will remove question 30 from the course evaluation of CPSC 4317 (Computer Networks) because the concept asked about in the question is not taught in that course (software testing procedures).
3. Regarding Outcome 2.7, the instructor will adjust some questions on the final exam in COSC 4310 (Computer Architecture). We will inform the instructor of COSC 2372

(Assembly Language) that indirect measure targets were not met in course evaluations for COSC 2372.

4. Regarding Outcome 6, we will ask the instructor in CPSC 4340 (Database) to emphasize teamwork in the course based on the targets that were not for course evaluations in CPSC 4340.
5. Regarding Outcome 9, we will remove course evaluation questions 27 and 35 from COSC 4272 (Senior Seminar) indirect measures since the instructor does not cover that material in the course.
6. Add the following courses to the list of approved electives:
 - CPSC 4361 Secure Software Engineering
 - CPSC 4363 Cybersecurity
 - COSC 3306 C++ Programming
7. Change the course number for Linear Algebra from MATH 3328 (Linear Algebra) to MATH 2318 in all documents, due to course number change by the math department.
8. Create a new course: COSC 4333 Distributed Systems. This is needed to respond to the need for this instruction per recommendations from ACM and requirements of ABET.
9. Due to changes to ABET assessment standards, modify the degree plan as follows:
 - a. Add COSC 4333 Distributed Systems as required.
 - b. Add choice of one of either CPSC 4361 Secure Software Engineering or CPSC 4363 Cybersecurity as required.
 - c. Remove 1 lab science course as required. This change will result in 2 lab science courses required compared to the previous 3.
 - d. Remove MATH 3322 | 3435 as required.
 - e. Update degree plan to 120 hours (from 121).
 - f. Rearrange the suggested degree plan as appropriate based on the current course rotation schedule and incorporating the new required CS courses (see Figure 4-2).
10. Revise department ABET assessment procedures, as documented in annual ABET reports, due to changes to ABET assessment standards.
11. Designated what were previously 9 Student Outcomes as 9 Curriculum Outcomes to make way for a new set of 6 required ABET Student Outcomes which are more general statements compared to the previous student outcomes which were more specific. This two-level scheme of outcomes will be reviewed again next year for possible collapse into a single level of outcomes in which case we will readjust all other assessment procedures as necessary. A seventh Student Outcome was added in addition to the 6 required by ABET since none of the 6 mapped directly to our Curriculum Outcome 9.

Revised BS in Computer Science 2019-2020

Name: _____

ID: _____

Current Advising Semester: _____

GPA: _____

First Year FALL

COSC 1336 Programming Fund I ¹		
COSC 1173 Programming Lab		
COSC 1172 Think, Speak, Write		
ENGL 1301 Composition I		
MATH 2413 Calculus I		
History 1 ³		

First Year SPRING

COSC 1337 Programming Fund II ¹		
COSC 1174 Fund Computing Lab II		
Social Science Elective ⁴		
ENGL 1302 Comp II ENGL 1374 Comp		
Language, Phil & Culture ¹⁰		
Communications Modern Language ²		

Second Year FALL

COSC 2336 Programming Fund III ¹		
MATH 2414 Calculus II		
Approved Lab Science ⁶		
POLS 2301 Gov I		

Second Year SPRING

COSC 2372 Comp Org/Assembly Lang		
COSC 2375 Discrete Structure		
POLS 2302 Gov II		
Approved Lab Science ⁶		
History 2 ³		

Third Year FALL

COSC/CPSC/ELEN Elective ⁸		
MATH 2318 Linear Algebra		
COSC 3304 Alg Des & Analysis		
MATH 3370 Intro Theory Statistical		
COSC 4333 Distributed Systems		

Third Year SPRING

COSC 3325 Computer Law/Ethics		
COSC 3302 Intro Comp Theory		
COSC 3308 Progr. Languages		
CPSC 4361 Sec. SE CPSC 4363 CyberSec.		
COSC CPSC Elective ⁷		

Fourth Year FALL

COSC 4302 Operating Systems		
COSC CPSC Elective ⁷		
Creative Arts Elective ⁵		
CPSC 4340 DataBase Design		
Academic Elective ⁹		

Fourth Year SPRING

CPSC 4360 Software Engineering		
COSC 4310 Computer Architecture		
COSC CPSC ELEN Elective ⁸		
COSC 4272 Senior Assessment		
CPSC 4317 Networks		

Notes: 120 Total Hours

(1) A grade of B or better is required in COSC 1336 before taking COSC 1337. A grade of B or better is required in COSC 1336 and COSC 1337 before taking COSC 2336.

(2) Communication 1315 | 1321 or DSDE 1371 or FREN 1311 or SPAN 1311.

(3) Two semesters of US or Texas History from among HIST 1301 | 1302 | 2301.

(4) Social Science Electives are: ECON 1301 | 2301 | 2302, PSYC 2301, SOCI 1301, BULW 1370, INEN 2373.

(5) Creative Arts Electives are: ARTS 1301 | 1303, DANC 2304, MUSI 1306, and COMM1375.

(6) Approved Lab Science must be chosen from following four courses: BIOL 1406 | 1407, PHYS 2425 | 2426

(7) Acceptable COSC/CPSC electives are: **COSC** - 3306 | 4301 | 4307 | 4309 | 4319 | 4322 | 4324 | 4345

CPSC - 3316 | 4315 | 4316 | 4320 | 4330 | 4361 | 4363 | 4370 | 4361 | 4363

(8) Acceptable COSC/CPSC/ELEN electives are: **COSC/CPSC** electives or **ELEN** - 3381 | 4486 | 4387 | 4304 (with approval)

(9) Sufficient academic elective hours are required to total 120 hrs. Any college level course which offers semester credit hrs is permitted.

(10) ENGL 2300 | 2310 | 2320 | 2322 | 2326 | 2331 | 2371 | 2376 or PHIL 1370 | 2306

**Figure 4-2. Suggested course of study for BS in CS degree
(Proposed revision for academic year 2019-2020).**

Changes made in 2018

These changes will take effect in the 2018-2019 academic year.

1. Since our assessment did not meet the direct target for criteria 2.1.2 (analyze the efficiency of algorithms) and Outcome 2 (analysis and design of algorithms) we will ask the instructor in COSC 3304 (Algorithms) to include data from both the midterm and final exam for our analysis next year (we currently are using only selected questions on the midterm).
2. COSC 3304 (Algorithms) will add additional assignments on designing algorithms and a separate design exam to help better assess student's ability to develop correct and efficient algorithms. This was planned for last academic year but was not accomplished due to the hurricane which disrupted the fall semester (and in fact disrupted the academic year).
3. The department will monitor the assessment result of performance criteria 2.6.2 in 2018-2019. The result for performance criteria 2.6.2. "Explain common network architectures, the services provided by each layer, and the protocols required for connecting peer layers." was improved by 14% compared to 2016-2017 and is very close to our target, 80%. The improvement was likely due to the fact we made COSC 4302 Operating Systems a co/pre-requisite for CPSC 4317 (Computer Networks).
4. Remove student course evaluation question 34 from Outcome 8 (Written Communication Skills) Strategies for indirect assessment for course COSC 1172 (Think, Speak & Write) since students writing skills are very formative when they are freshman. Our analysis indicated results were unfairly below the target due to students formative writing skills at this early point in the program.
5. Added new prerequisites to COSC 4301 (Special Topics): COSC 2336 (Data Structures) and COSC 2375 (Discrete Structures) or consent of department head upon instructor recommendation.

Changes made in 2017

These changes will take effect in the 2017-2018 academic year.

1. Based on the feedback from members during our annual Advisory Board meeting in 2017 we modified our Program Educational Outcome #4 as follows:

PREVIOUS VERSION

Graduates of the Computer Science Program will demonstrate intellectual curiosity and the independent study skills necessary for life-long learning.

MODIFIED VERSION

Graduates of the Computer Science Program will **be able** to demonstrate intellectual curiosity and the independent study skills necessary for life-long learning.

2. We removed student evaluation questions 25, 26 and 29 for CPSC 4340 (Database) for Outcome 1 from Sources of Data for Evaluations for Learning Outcomes (see Table E.2). This was done based on feedback from the primary instructor who indicated those questions were not relevant to that course.
3. Based on feedback from faculty who teach courses in which design documentation is an important part of their courses, we modified question 31 on the student course evaluations as follows:

PREVIOUS VERSION

This course provided you instruction on the proper documentation of source code.

MODIFIED VERISON

This course provided you instruction on the proper documentation of design or source code.

4. Change the networking course number from CPSC 3320 (Computer Networks) to CPSC 4317.
5. Add COSC 2375 (Discrete Structures) to “Introduction” strategies in curriculum map for Outcome 2.3, performance criteria 2.3.4.
6. Removed ETS scores for Outcome 3 (Scientific Method) and Outcome 6 (Collaborative Work Skills) Sources of Data for Evaluations of Learning Outcomes – Indirect Measures (see Table E.2 and image below) based on the consensus of the Assessment Committee that this data was not particularly relevant for these outcomes.

2.6	CPSC 3320	28,30,38,39,40				
2.7	COSC 2372	27,31,35,40				
	COSC 4310	35,38,40				
3	COSC 2336 CPSC 3320 COSC 4310	37,38,40 37,38,40 35,37,38,40	3,4,6,7		3,4,6,7	The 3 Assessment Indicators (Programming, Computer Organization, Algorithms and Theory)
4	COSC 1172 COSC 3325 COSC 4310	41 41 41	5,9		5,9	

7. COSC 3304 (Algorithms) will add additional assignments on designing algorithms and a separate design exam to help better assess student’s ability to develop correct and efficient algorithms.

Changes made in 2016

1. In COSC 1172 (Think, Speak, Write) we will experiment with using the Blackboard Collaborate software in order to improve student learning for Outcome 8 (written communication skills).
2. Regarding the targets for indirect measures in some courses that were not met this year as compared to last year, the department assessment committee will make the instructors aware of this (see details in Table G.1).
3. We will offer COSC 3325 (Ethics) in spring 2017. It was offered during the previous academic year in summer due to scheduling problems that arose due to a faculty member who went on leave unexpectedly.

Changes made in 2015

1. For Outcome 2.3, question 30 (the knowledge of design and apply relevant software testing procedure) will be removed from indirect results since this topic is not covered in COSC 3302 (Computer Theory). (effective last academic year)
2. For Outcome 8, we will notify the instructors of COSC 3325 (Ethics), CPSC 4360 (Software Engineering) and COSC 4302 (Operating Systems) of the fact that the program did not meet the target for performance criteria 1 and 3, and we will remind them that their courses are among those selected to teach and assess writing skills for computer science. Courses with written projects are COSC 3325, CPSC 4360, COSC 4272 (Senior Seminar), and COSC 4302 (approved Oct. 17, 2011).
3. Add to the Curriculum Map COSC 2375 (Discrete Structures) in Outcome 2.1, criteria 2,3 as 'I' and Outcome 2.2, criteria 1,4 as 'I'. The effect of this is to show that COSC 2375 now supports COSC 3304 (Algorithms). (effective starting fall 2015)
4. Removed ELEN 3431 from Outcome 2.1.3 Strategies. (effective last academic year since this course is no longer a required course in the CS B.S. degree plan)
5. Change CPSC 3320 (Computer Networks) to CPSC 4316 in all documents. (effective starting fall 2015). Note: This was later changed to CPSC 4317.
6. The Assessment Committee looked closely at the feedback from the Advisory Board and made the following comments:
 - a. The Board wanted to see teaching in these areas and we currently have them covered by the following faculty members:
 - i. Bioinformatics – Dr. Zhang
 - ii. Mobile Computing – Dr. Roden
 - iii. 3D Printing – Dr. Andrei
 - iv. Big Data – Dr. Wang

- b. The Board wanted to make sure students were learning how to debug software. The committee discussed this and recommended change 4. (above).
- c. The Board wanted to hear another report at the next annual meeting from the Lamar CIO. So, we will ask the CIO to come to the next annual meeting in 2016 and give a report regarding IT at Lamar to the Board.

Changes made in 2014

1. For Outcome 1, performance criteria 2, which states “apply important design patterns to OOD”, instructors in CPSC 4360 (Software Engineering) will be made aware that this topic deserves more attention.
2. For Outcome 1, performance criteria 5, which states “debug implemented software in a proficient manner”, we will remove COSC 3304 (Algorithms) as a direct measure of this criteria since debugging is not a significant topic in that course. We will add COSC 2336 (Data Structures) and COSC 2372 (Assembly Language) and introduce techniques of debugging in these two courses since these courses are a good place for this topic.
3. We will make COSC 2375 (Discrete Structures) a prerequisite for COSC 3304 (Algorithms) and not allow students to take those courses in the same semester. This should better prepare students for topics in COSC 3304 related to elementary concepts of combinatorics, probability and statistics used to analyze algorithms.
4. Since target measures for student evaluations were not met in some courses for outcome 2.3, 2.5 and 2.7, we will inform instructors of this fact.
5. We will monitor COSC 3325 (Ethics) to insure instruction is consistent since we had two different views of students based on Exit surveys.
6. We will remove questions 25 and 26 from the student evaluations in COSC 1172 (Think, Speak & Write) and remove COSC 1172 from strategies in outcome 6 because freshman have enough to do and we do not want to overload them their first semester. Due to these changes we will not emphasize teamwork as an outcome in COSC 1172.
7. The Assessment Committee noticed that question 34 on the student evaluations was incorrectly worded, probably due to a clerical error after the department submitted it. We will make the necessary corrections. Also, we will remove question 37 from COSC 4172/4272 (Senior Seminar) as it is not relevant for those courses.
8. Due to Advisory Board feedback at the spring 2013 meeting, PEO 1 will be changed:

PREVIOUS

Graduates of the Computer Science Program will develop the professional skills and the necessary technical knowledge both in breadth and in depth to prepare them for employment or advanced study in Computer Science

NEW VERSION

Graduates of the Computer Science Program will develop the professional skills and the necessary technical knowledge both in breadth and in depth to prepare them for employment and advanced study in Computer Science.

9. Due to Advisory Board feedback at the spring 2013 meeting, PEO 2 will be changed:

PREVIOUS

Graduates of the Computer Science Program will have sufficient awareness of the local and global societal impact of technology and of the ethical issues in computer science to make decisions regarding their personal and professional responsibilities.

NEW VERSION

Graduates of the Computer Science Program will have sufficient awareness of the local and global societal impact of technology and of the related legal and ethical issues in computer science to make decisions regarding their personal and professional responsibilities.

C. Additional Information

Copies of assessment instruments for indirect measures are listed in Appendix F. Direct measure instruments include individual course rubrics plus assignments and test questions used to assess ABET-related student learning outcomes. At the end of each semester, instructors upload and archive these assessment instruments to the Department internal website. Procedures for utilizing assessment instruments, both direct and indirect, in the Department's assessment methodology are given in Appendix E.

Meeting minutes of the Assessment Committee during the academic year are listed in Appendix J. Meetings minutes of other committees are archived by the Department secretary. These include minutes from general faculty meetings as well from Undergraduate Curriculum Committee meetings if those meetings were relevant to the assessment and continuous improvement process.

CRITERION 5. CURRICULUM

A. Program Curriculum

1. Our BSCS program has the following four Program Educational Objectives:
 - [1] Graduates of the Computer Science Program will develop the professional skills and the necessary technical knowledge both in breadth and in depth to prepare them for employment and advanced study in Computer Science.
 - [2] Graduates of the Computer Science Program will have sufficient awareness of the local and global societal impact of technology and of the related legal and ethical issues in computer science to make decisions regarding their personal and professional responsibilities.
 - [3] Graduates of the Computer Science Program will have the critical thinking, communication, teamwork, and leadership skills necessary to function productively and professionally.
 - [4] Graduates of the Computer Science Program will be able to demonstrate intellectual curiosity and the independent study skills necessary for life-long learning.

The curriculum has been aligned with the program educational objectives in the following ways:

Clearly, we expect the curriculum to prepare our students for employment and/or graduate study. Consequently, our students must learn the material concerning analysis, design, implementation, and testing of software. Also, our students must be shown problems that require construction of mathematical models and algorithms that represent solutions. Our curriculum not only teaches students how to do this but also how to translate the solutions into computer programs. Programming Fundamentals I, II, and III, Algorithm Design & Analysis, Software Engineering, Database Design, Computer Architecture, Operating Systems, and many other courses contribute to the achievement of Objective 1.

Objective 1 is directly addressed in COSC 3325, the Computer Law and Ethics course, but other courses also mention issues in societal impact and ethics. Some of these courses are Computer Networking, Database Design, Thinking, Speaking, and Writing in Computer Science, and Senior Seminar.

Objective 3 is addressed by a set of courses that has been designated to include oral communications, written communications, and team projects. These courses are as follows: Oral Communications: COSC 3325, CPSC 4360, and COSC 1172; Written Communications: COSC 3325, CPSC 4360, COSC 1172, CPSC 4340, and COSC 4302; Team Projects: COSC 1172, CPSC 4360, CPSC 4340, and COSC 4302.

Objective 4 is addressed in the curriculum by courses that require the student independently to find resources in the library or online to solve new problems. Courses like Thinking, Speaking, and Writing in Computer Science, Computer Law and Ethics, Senior Seminar, and Database Design require practice in independent study skills. Lifelong learning is directly discussed with every graduating senior in COSC 4272: Senior Seminar.

Students are well prepared for graduate studies. In particular, Table 5-1 shows how required courses in the BSCS curriculum prepare our students for the core M.S. courses at Lamar University.

Table 5-1. Mapping of required BSCS courses to MS core courses

Required B.S. Courses	M.S. Core Courses
CPSC 4360 (Software Engineering)	CPSC 5360 (Software Engineering)
COSC 4302 (Operating Systems)	COSC 5302 (Advanced Operating Systems)
COSC 3304 (Algorithm Analysis and Design)	COSC 5313 (Algorithm Analysis and Design)
CPSC 4317 (Computer Networks)	COSC 5328 (Computer Networks)

2. The curriculum in the BSCS degree plan and associated prerequisite courses have been structured to support the attainment of the student outcomes.

The details of our current Curriculum Map are in Appendix H.

3. The flowchart shown in Figure 5-1 illustrates the prerequisite structure of our BSCS program's required courses.

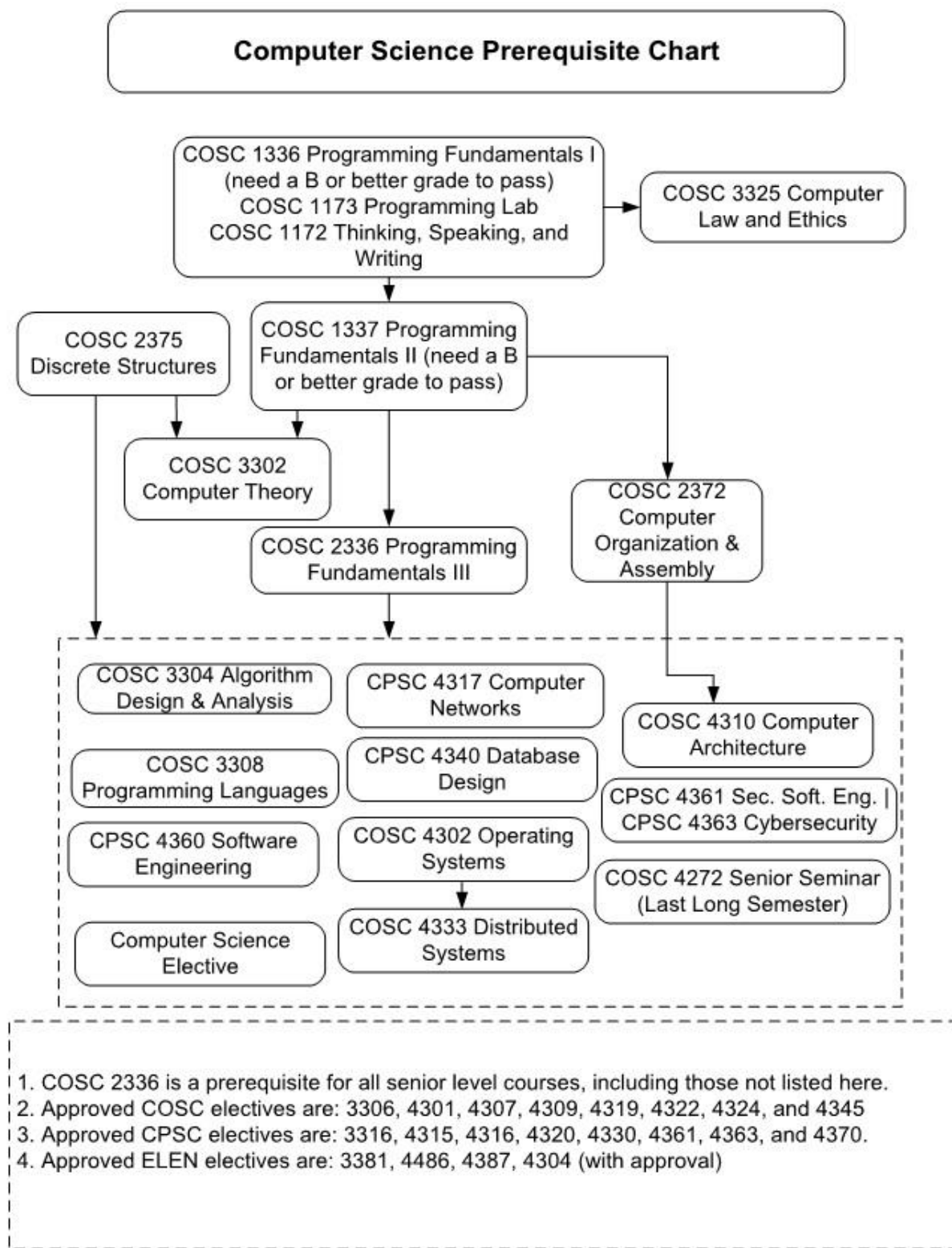


Figure 5-1. Prerequisite Chart of Computer Science Courses.

(Note: The following courses are proposed to be added in academic year 2019-2020: COSC 4333, CPSC 4361/4363)

4. The total credit hours required for our BSCS degree is 121 hours. Table 5-2 shows detailed information about the degree.

a. Computer science: One and one-third years that must include:

- i. Coverage of the fundamentals of algorithms, data structures, software design, concepts of programming languages and computer organization and architecture.

The core materials of our BSCS degree plan provide basic coverage of algorithms, data structures, software design, concepts of programming languages, and computer organization and architecture.

Required Computer Science courses cover these areas:

COSC 1172 Thinking, Speaking, and Writing
COSC 1173 Programming Lab I
COSC 1174 Programming Lab II
COSC 1336 Principles of Computer Science I
COSC 1337 Principles of Computer Science II
COSC 2336 Data Structure & Algorithms
COSC 2372 Computer Organization & Assembly
COSC 3304 Algorithm Design & Analysis
COSC 3308 Survey of Programming Languages
CPSC 4360 Software Engineering

- ii. Introduction to a variety of programming languages and systems.

The core materials of our BSCS degree plan require the use of a variety of programming languages, such as Assembly, Java, C++, and C. In Design of Programming Languages (COSC 3308), students are introduced to a variety of language concepts used in declarative, functional, concurrent, object-oriented programming languages, and others that illustrate different language paradigms. They also require the use of a variety of systems, such as Windows, Linux, Solaris, and MacOS.

- iii. Proficiency in at least one higher-level language.

Java Language is required in COSC 1336 Programming Fundamentals I, COSC 1337 Programming Fundamentals II, and COSC 2336 Data Structures.

Proficiency in Java is enforced by requiring a minimum of a 'B' grade in COSC 1336 and COSC 1337. Moreover, students in some junior and senior level courses (such as CPSC 4360 Software Engineering) use Java Programming Language to finish projects. Students are expected to be proficient in Java Programming Language upon completing these courses.

- iv. Advanced course work that builds on the fundamental course work to provide depth.

Students pursuing the BSCS degree may study the following advanced topics:

Software Systems: COSC 3304, COSC 4302, CPSC 4360.

Computer Networking: CPSC 4317 and two of (COSC 4345 or CPSC 4320 or Computer Forensics (which is currently running as a special topics course COSC 4301)).

Database Systems: CPSC 4340 and two from COSC 4301 Data Mining (special topic), COSC 4301 Bioinformatics (special topics), or any other COSC 4301.

Theory of Computer Science: COSC 3308, COSC 3302.

Computer Architecture: COSC 4310.

Game Development: COSC 4324, COSC 4325

Students also select to take Computer Security, Real Time System, Embedded System, Graphics, Artificial Intelligence, Machine Learning, Multimedia Processing, Network System Administration, and Simulation as COSC/CPSC electives.

- b. One year of science and mathematics

- i. Mathematics.

Students pursuing the BSCS degree are required to take the following Mathematics courses (21 hours):

COSC 2375 Discrete Structures

MATH 3328 Linear Algebra I

MATH 2413 Calculus and Analytic Geometry I

MATH 2414 Calculus and Analytic Geometry II

MATH 3435 Calculus and Analytic Geometry III

MATH 3370 Introduction to the Theory of Statistical Inference

- ii. Science.

Students pursuing the BSCS degree are required to take three of these courses from the following Lab Science courses (12 hours), in no particular sequence:

BIOL 1406 General Biology I,

BIOL 1407 General Biology II

CHEM 1411 General Chemistry I

CHEM 1412 General Chemistry II

PHYS 2425 Calculus-based Physics I

PHYS 2426 Calculus-based Physics II

5. The program does not allow cooperative education to satisfy curricular requirements specifically addressed by either the general or program criteria.

Table 5-2. Curriculum
Bachelor of Science in Computer Science

Course (Department, Number, Title) List all courses in the program by term starting with first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE. ^a	Subject Area (Credit Hours)				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Average Section Enrollment for the Last Two Terms the Course was Offered ^b
		Math & Sciences	Computing Topics Mark with an F or A for Fundamental or Advanced	General Education	Other		
Freshman Year – Semester 1							
COSC 1336 Programming Fundamentals I ¹	R		F			<i>S19, Summer19</i>	24
COSC 1173 Programming Laboratory	R		F			<i>S19, Summer19</i>	15
COSC 1172 Think, Speak, Write	R		F			<i>S19, Summer19</i>	43
ENGL 1301 Composition I	R			X		<i>S19, Summer19</i>	16
MATH 2413 Calculus I	R	X				<i>S19, Summer19</i>	32
History 1 ³	SE			X		<i>S19, Summer19</i>	30
Freshman Year – Semester 2							
COSC 1337 Programming Fundamentals II ¹	R		F			<i>S19, Summer19</i>	13
COSC 1174 Fundamentals Computing Lab II	R		F			<i>S19, Summer19</i>	12
COSC 2375 Discrete Structures	R	X				<i>F18, S19</i>	24

ENGL 1302 1374 Composition II	SE			X		<i>S19, Summer19</i>	<i>15</i>
Social Science Elective ⁴	SE			X		<i>S19, Summer19</i>	<i>Various Courses</i>
Communications Modern Language ²	SE			X		<i>S19, Summer19</i>	<i>Various Courses</i>
Sophomore Year – Semester 1							
COSC 2336 Programming Fundamentals III ¹	R		F			<i>F18, S19</i>	<i>13</i>
MATH 2414 Calculus II	R	X				<i>S19, Summer19</i>	<i>25</i>
Approved Lab Science ⁶	SE	X				<i>S19, Summer19</i>	<i>Various Courses</i>
Language, Phil & Culture ¹⁰	SE			X		<i>S19, Summer19</i>	<i>Various Courses</i>
Sophomore Year – Semester 2							
COSC 2372 Computer Organization & Assembly Language	R		F			<i>F18, S19</i>	<i>53</i>
COSC 3304 Algorithms Design & Analysis	R		A			<i>S19, Summer19</i>	<i>22</i>
MATH 2318 Linear Algebra	R	X				<i>S19, Summer19</i>	<i>24</i>
Approved Lab Science ⁶	SE	X				<i>S19, Summer19</i>	<i>Various Courses</i>
History 2 ³	SE			X		<i>S19, Summer19</i>	<i>33</i>
Junior Year – Semester 1							
COSC CPSC/ELEN Elective ⁸	SE		A			<i>S19, Summer19</i>	<i>Various Courses</i>
CPSC 4317 Computer Networks	R		A			<i>S19, Summer19</i>	<i>16</i>
COSC 3308 Programming Languages	R		A			<i>F18,</i>	<i>17</i>

						<i>Summer19</i>	
MATH 3370 Intro Theory Statistical Inference	R	X				<i>S19, Summer19</i>	26
Lab Science ¹¹	SE	X				<i>S19, Summer19</i>	<i>Various Courses</i>
Junior Year – Semester 2							
COSC 3325 Computer Law & Ethics	R		A			<i>S19, Summer19</i>	10
COSC 3302 Computer Theory	R		A			<i>S18, S19</i>	47
CPSC 4340 Database Design	R		A			<i>F18, Summer19</i>	17
MATH 3322 3435	SE	X				<i>F18, S19</i>	17
COSC CPSC Elective ⁷	SE		A			<i>S19, Summer19</i>	<i>Various Courses</i>
Senior Year – Semester 1							
COSC 4302 Operating Systems	R		A			<i>S19, Summer19</i>	20
COSC CPSC Elective ⁷	SE		A			<i>S19, Summer19</i>	<i>Various Courses</i>
Creative Arts Elective ⁵	SE			X		<i>S19, Summer19</i>	<i>Various Courses</i>
POLS 2301 Government I	R			X		<i>S19, Summer19</i>	40
Academic Elective ⁹	SE			X		<i>S19, Summer19</i>	<i>Various Courses</i>
Senior Year – Semester 2							
CPSC 4360 Software Engineering	R		A			<i>S19, Summer19</i>	16

COSC 4310 Computer Architecture	R		A			<i>F18, Summer19</i>	<i>14</i>
COSC CPSC ELEN Elective ⁸	SE		A			<i>S19, Summer19</i>	<i>Various Courses</i>
COSC 4272 Senior Assessment	R		A			<i>S19, Summer19</i>	<i>11</i>
POLS 2302 Government II	R			X		<i>S19, Summer19</i>	<i>29</i>
TOTALS-ABET BASIC-LEVEL REQUIREMENTS							
OVERALL TOTAL CREDIT HOURS FOR COMPLETION OF PROGRAM	121						

1. **Required** courses of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
2. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be provided during the campus visit

- (1) A grade of B or better is required in COSC 1336 before taking COSC 1337. A grade of B or better is required in both COSC 1336 and COSC 1337 before taking COSC 2336.
- (2) Communication 1315 | 1321 or DSDE 1371 or FREN 1311 or SPAN 1311.
- (3) Two semesters of US or Texas history from HIST 1301 | 1302 | 2301.
- (4) Social Science electives are: ECON 1301, PSYC 2301, SOCI 1301, BULW 1370, or (both ECON 2302 & ECON 2301)
- (5) Creative Arts electives are: ARTS 1301 | 1303, DANC 2304, MUSI 1306, and COMM 1375.
- (6) Approved Lab Science must be chosen from following four courses: BIOL 1406 | 1407, PHYS 2425, 2426
- (7) Acceptable COSC/CPSC electives are: COSC 4301 | 4307 | 4309 | 4319 | 4322 | 4324 | 4325
CPSC 3316 | 4315 | 4316 | 4320 | 4330 | 4345
- (8) Acceptable COSC/CPSC/ELEN electives are: COSC/CPSC electives (above list) or ELEN 3381 | 4486 | 4387 | 4304 (with approval)
- (9) Sufficient academic elective hours are required to total at least 120 hours. Any college level course which offers semester credit hours is permitted.
- (10) ENGL 2300 | 2310 | 2320 | 2322 | 2326 | 2331 | 2371 | 2376 or PHIL 1370 | 2306
- (11) Lab Science must be chosen from the following six courses: CHEM 1411 | 1412, BIOL 1406 | 1407, PHYS 2425 | 2426

CRITERION 6. FACULTY

A. Faculty Qualifications

Faculty members who teach courses in the Computer Science program include 11 full time tenured/tenure track faculty members and two full-time instructors. Our department is proud to have faculty with strong records of research, teaching, and funded grants. One full-time instructor has a M.Ed. in Computer Science. He teaches microcomputer applications courses for non-majors. We also have several part-time adjuncts who teach courses for majors and non-majors. The size and qualifications of our faculty are more than adequate to cover all curricular areas of the program. Table 6.1 contains detailed information on faculty qualifications. Appendix B contains faculty resumes.

B. Faculty Workload

The typical teaching load for full-time tenured/tenure track faculty is three 3-credit hour courses per long semester. Many of the faculty members regularly receive release time for participation in grant-funded research and projects, and one has received release time for serving as President of the Faculty Senate. This provides adequate time for teaching, research, and service. Table 6-2 contains detailed information on workload summary.

C. Faculty Size

The size of the faculty is large enough to provide a small student-to-faculty ratio in our classes. This permits one-on-one interactions in many of our classes. Freshmen and sophomores are advised in the new University Undergraduate Advising Center. Computer Science faculty advise juniors and seniors. Each faculty member advises 5 to 10 students. The Department Chair advises graduate students. Dr. Bo Sun is the undergraduate freshman and sophomore advisor for all CS students and oversees undergraduate course scheduling. Dr. Timothy Roden is the undergraduate advisor for upper-level students (juniors and seniors) interested in game development. Dr. Osborne serves as departmental representative with Alumni Relations, including the Computer Science Industrial Advisory Board. Dr. Xingya Liu serves as advisor to Lamar's ACM chapter. There are standing committees on curriculum and assessment, with almost all faculty members serving on one of these two committees. Recommendations of these two committees go to the entire faculty for approval.

D. Professional Development

All faculty members are active in research. Most of our faculty have externally funded grants for research and education. Faculty regularly publish papers in peer reviewed journals and conference proceedings. External funding combined with internal support from the Dean, Provost, and Office of Sponsored Research provides funds for faculty to participate in professional meetings and conferences. Some faculty participate in ABET workshops and National Science Foundation review panels. Several faculty are active in organizational service with professional conferences. Faculty members also participate in on-campus

faculty development workshops sponsored by the Lamar University Center for Teaching and Learning. Faculty members have been actively engaged in preparing materials for new online courses.

E. Authority and Responsibility of Faculty

Faculty members are responsible for creating and modifying all course materials. Selected tenured faculty members observe classes of tenure track faculty each semester and provide feedback to improve instruction. Faculty and the Computer Science Industrial Advisory Board participate in formulating and modifying the program's learning objectives. The syllabus for each course lists the learning objectives for that course. Student outcomes on individual course objectives are measured by the course instructors. The Department's Assessment Committee has mapped program outcomes to individual courses and developed performance criteria for each outcome. Learning objectives are included throughout the curriculum, in courses that introduce the relevant concepts, others that reinforce the concepts, and summative courses that measure student outcomes on each of the performance criteria for assessment. Student outcomes on each of the performance criteria are measured by the instructors of those summative courses. The Department's Curriculum Committee makes recommendations with respect to curriculum changes. These suggestions are voted on by the entire faculty before being adopted and implemented.

Table 6-1. Faculty Qualifications
Bachelor of Science in Computer Science

Faculty Name	Highest Degree Earned- Field and Year	Rank ¹	Type of Academic Appointment ² T, TT, NTT	FT or PT ³	Years of Experience			Professional Registration/ Certification	Level of Activity ⁴ H, M, or L		
					Govt./Ind. Practice	Teaching	This Institution		Professional Organizations	Professional Development	Consulting/summer work in industry
Stefan Andrei	Ph.D. in C.S. 2000	P	T	FT	0	23	13		H	H	L
Peggy Doerschuk	Ph.D. in C.S. 1990	P	T	FT	0	29	26		L	H	L
Hikyoo Koh	Ph.D. in C.S. 1978	P	T	FT	0	38	38		L	L	L
Jiangjiang Liu	Ph.D. in C.S. & E 2004	P	T	FT	0	15	15		L	H	L
Xingya Liu	Ph.D. in C.E. 2017	AST	TT	FT	0	2	2				
Kami Makki	Ph.D. in C.S. 1997	P	T	FT	5	20	15		H	H	L
Lawrence Osborne	Ph.D. in C.S.1989	P	T	FT	0	37	29		L	H	L
Timothy Roden	Ph.D. in C.S. 2005	ASC	T	FT	9	18	7		L	H	L
Bo Sun	Ph.D. in C.S. 2004	P	T	FT	0	15	15		L	H	L
Sujing Wang	Ph.D. in C.S. 2014	AST	TT	FT	0	13	13		L	M	L
Jing Zhang	Ph.D. in C.S. 2012	AST	TT	FT	0	13	13		L	M	L

1. Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor A = Adjunct O = Other
2. Code: T = Tenured TT = Tenure Track NTT = Non Tenure Track
3. Code: FT = Full-time PT = Part-time Appointment at the institution.
4. The level of activity (high, medium or low) should reflect an average over the year prior to the visit plus the two previous years.

Table 6-2. Faculty Workload Summary

Bachelor of Science in Computer Science

Faculty Member (name)	PT or FT ¹	Classes Taught (Course No./Credit Hrs.) Term and Year ²	Program Activity Distribution ³			% of Time Devoted to the Program ⁵
			Teach ing	Research or Scholarship	Other ⁴	
Stefan Andrei	FT	COSC 3304 (3), COSC 3325(3), COSC 3308 (3), COSC 2375 (3), COSC 1336(3), COSC 2336 (3), COSC 4272 (2), COSC 4301 (3), COSC 5340 (3)- Fall 2018 COSC 3304 (3), COSC 3325 (3), COSC 5315 (3), COSC 4272 (2), CPSC 4360/5360 (3)- Spring 2019	20	20	60	100
Peggy Doerschuk	FT	CPSC 4370/5370 (3), CPSC 4360/5360 (3) COSC 2336 (3)- Fall 2018 COSC 2336 (3), CPSC 4375/5375 (3) – Spring 2019	60	20	20	100
Hikyoo Koh	FT	COSC 5313 (3), COSC 4304 (3), COSC 3302 (3) – Spring 2019	60	20	20	100
Jiangjiang Liu	FT	COSC 4310 (3), CPSC 5330/4330 (3) – Fall 2018 COSC 5310/4310 (3), COSC 4301 (3), COSC 5340 (3) – Spring 2019	40	40	20	100
Xingya Liu	FT	COSC 4301 (3), COSC 5340 (3) – Fall 2018 CPSC 4363/ 5363 (3), COSC 5328 (3) – Spring 2019	40	40	20	100
Kami Makki	FT	COSC 1174 (1), COSC 5100 (1), COSC 1337 (3), CPSC 5340/4340 (3) – Fall 2018 COSC 1174 (1), COSC 5100 (1), COSC 1337 (3), COSC 4301 (3), COSC 5311 (3), COSC 5340 (3) – Spring 2019	60	20	20	100
Lawrence Osborne	FT	COSC 5302 (3), CPSC 4317 (3), COSC 5369 (3) – Fall 2018 COSC 2375 (3), COSC 3304 (3), COSC 5302 (3) – Spring 2019	40	30	30	100
Timothy Roden	FT	COSC 4324/5324 (3), COSC 4304 (3), COSC 1336 (3), COSC 1324 (3), COSC 2324 (3) – Fall 2018 CPSC 4381/5381 (3), COSC 4325/5325 (6), COSC 5324 (3), COSC 1324 (3), COSC 1336 (3) – Spring 2019	60	20	20	100
Bo Sun	FT	COSC 5328 (3), COSC 4302 (3) – Fall 2018 COSC 4301 (3), COSC 4302 (3), CPSC 4317 (3), COSC 5345 (3) –	40	30	30	100

		Spring 2019				
Sujing Wang	FT	COSC 1173 (1), COSC 1336 (3), COSC 3306 (3), COSC 5315 (3) – Fall 2018 COSC 1173 (1), COSC 1336 (3) – Spring 2019	40	40	20	100
Jing Zhang	FT	COSC 4301 (3), COSC 5313 (3), COSC 2372 (3), COSC 5340 (3) – Fall 2018 COSC 4319 (3), COSC 5321 (3), COSC 2372 (3), COSC 5369 (3) – Spring 2019	50	40	10	100

1. FT = Full Time Faculty or PT = Part Time Faculty, at the institution
2. For the academic year for which the Self-Study is being prepared.
3. Program activity distribution should be in percent of effort in the program and should total 100%.
4. Indicate sabbatical leave, etc., under "Other."
5. Out of the total time employed at the institution.

CRITERION 7. FACILITIES

A. Offices, Classrooms and Laboratories

1. Offices

Faculty offices are approximately 110 square feet, which is relatively small. However, the offices have been renovated with new furniture, bookshelf, cabinets for document storage, new telephone equipment, and new internal wiring for wireless connectivity as well as fixed network connection. Every tenure-track faculty member, lecturer, and adjunct have a private office. In addition, every tenure-track faculty member except one has another room designated as a research lab, equipped with computers and electronic systems where faculty and students interact. Offices are in the same building as the classrooms and labs. This gives the student ready access to faculty during regular hours most of the day. The Department Chair's office is in the east wing, second floor of the building near the faculty offices, while the laboratories are on the other opposite side of the second floor. The classrooms are on the first floor. Every office has a telephone, at least one networked PC, a printer, and software similar to that in labs, with additional software to support individual research activities. Faculty can also have a scanner upon request to the Department Chair. Every office has at least one chair for visitors.

The offices are on the interior of the building and are windowless. They have automatic fluorescent sensor-detection lighting. All the faculty offices are mainly located in two hallways.

The Department Office (Room 57 Maes) contains two separate rooms. An outer office is arranged to receive the public as well as faculty and students. This office contains large filing cabinets, three desks, two computers, a fax machine, and a laser printer. The outer office opens into an inner room (Maes 57-A) that is designed to be more private. Maes 57-A is occupied by the Department Chair, Dr. Stefan Andrei. The outer office is occupied by our Senior Administrative Associate, Ms. Paula Gregory and a Student Office Assistant. This area has a table supporting a typewriter and other various office devices.

The Department Chair's office is approximately 190 square feet. It has built-in shelves on one wall and three bookcases on another. A U-shaped desk, filing cabinet, and three visitors' chairs, a computer, and a laser printer fill the space.

In summary, faculty offices are adequate to meet the instructional and professional needs of those who occupy them. Offices are easily accessible to students and are well equipped, if somewhat small.

2. Classrooms

All computer science classes are generally taught in one of four classrooms 106, 107, 109, and 111 in the Maes Building. In addition, classes may meet in one of the labs for hands-on instruction. The labs used for this purpose are: rooms 208, 212, 213, 214, 215 and 218. These labs also provide wireless access capability for students. The size of wired bandwidth for these labs has increased to 1 Gigabits from 100 Megabits in 2012. The Department has high luminescence projectors in each classroom and in Room 212 and 213. The classroom 107 is Smart Classrooms with Dell desktop computers, ELMO document cameras, and VCRs. The lab in 218 has both projector and screen and a 4K television that faculty can use to plug in a smartphone or other similar device. All the rooms have data connections to the Internet and pull-down screens.

Room 208 has 26 computers, 22 of them running Linux and 4 Apple iMac.

Room 212 has 36 computers running Windows and a number of other software such as (MATLAB, Microsoft Office, Microsoft Visual Studio, Netbeans, Notepad++, Scratch, WinSCP, and Microsoft Expressions).

Room 213 has 26 computers running Windows and a number of other software such as (QTSpim, Adobe LiveCycle, Android SDK Tools, AppInventor, GameStudio A8, MATLAB, Microsoft Expression, Microsoft Office, Microsoft Visual Studio, Netbeans, Notepad++, Scratch, WinSCP, Xming).

Room 214 has 22 computers in which 10 of them are Solaris, 10 are Macintosh and which have software such as (Adobe Creative Suite, Eclipse, Netbeans, Microsoft Office), and 2 running Windows and a number of other software such as (Netbeans Eclipse, PuTTY, Microsoft Office, Basic Micro Studio, MATLAB).

Room 215 has 24 computers running Windows and other software such as (Microsoft Office, Netbeans, Eclipse, ArgoUML, MATLAB, Notepad++, PuTTY, Scratch. Department has also supported by a number of servers which are housed in these labs, such as: 6 SUN Sunfire Server with Linux OS, 1 RACK SUN Storage Tek 1000-42, 6 Linux Server, 2 SUN Ultra workstation with Solaris OS.

Room 218 has 20 Dell Alienware computers running Windows and a number of other software such as (Lightwave 3D, Adobe Photoshop, Microsoft Visual Studio, Eclipse, and Android Studio).

The labs that are used for instruction have blackboards or whiteboards. In all the classrooms faculty can bring their laptops and connect to projectors.

The classrooms on the first floor are traditional classrooms with multiple blackboards.

The Department has one VCR stored in the Department office and a video monitor on a wheeled cart. An instructor can carry the VCR to any of the classrooms and show video on the monitor or on the screen in Room 211 through the ELMO.

In our opinion, classrooms are adequately equipped at this time.

3. Laboratory Facilities

The Department has several research laboratories. These labs are equipped with the state-of-the-art computer facilities purchased either through the faculty research grants or their start-up fund. These labs are: Real-Time Embedded Systems Laboratory (Dr. Andrei), GPU Education Laboratory (Dr. Osborne), Game Development Laboratory (Dr. Roden), Wireless Laboratory (Dr. Sun), Data Science Laboratory (Dr. Wang), Cybersecurity Laboratory (Dr. X. Liu) Computer Architecture Laboratory (Dr. J. Liu), Advanced Systems and Database Laboratory (Dr. Makki), Artificial Intelligence & STAIRSTEP Laboratory (Dr. Doerschuk), and Computer Vision and Pattern Recognition Laboratory (Dr. Zhang). In these labs faculty conduct their research and work with their students.

The University renovated the Maes building and has improved the quality of facilities and equipment (such as lighting, bathrooms, etc.) for this building. Also, several classrooms and labs have been renovated to accommodate our specific needs. Room 216 was renovated during summer 2013. Half of the room is now used to house the Game Development Laboratory (GDL). The GDL is used in connection with the game development courses that were added in 2013-2014. The other half is used by Dr. Jiangjiang Liu to support her teaching and research.

The administration accommodated all student requests by installing electric power plugs and land-line Internet connectors in the open common area located in second floor of Maes Building.

B. Computing Resources

1. Central Computing

The Information Technology Division's Central Computing facility is in the Cherry Engineering Building, which provides university IT and web services. Faculty and students can use single sign-on through the myLamar Portal to access services including registration, Blackboard, email, and internal web services.

All equipment and software in the Central Computing facility is covered by protected facility environment and maintenance agreements to insure the latest versions of software are installed and maximum uptime is provided to students and faculty. All computer systems are connected to the University's fiber optic backbone using Gigabit Ethernet. The University offers campus-wide wireless and VPN connectivity to the campus network.

The Microcomputer Support & Services Department provides campus-wide support by phone and Internet.

The Microcomputer Support & Services Department provides software to faculty and students such as the Microsoft Office suite covered by a Microsoft License Agreement site license as well as the Adobe Creative Studio suite which includes Adobe Acrobat and Dreamweaver, among others.

2. Computer Science Department

The Department of Computer Science server room is in room 208C of the Maes building with a dedicated air conditioning unit. The department hosts a DELL PowerVault MD 3600 Storage with 20 Terabyte disk space. The department also hosts a department file server, application server, web, email, DNS and database server for teaching purposes. There are 2 DELL PowerEdge R620 servers, 3 DELL PowerEdge 640, and 3 SUN Fire servers. The department also hosts a HPC cluster (2 Dell R640 head nodes, 1 Dell R640 login node, 46 computing nodes, 2 GPU nodes, and 1 big memory nodes. This cluster runs Linux CentOS 7, and the Bright Computing management system. It is open for campus use.

C. Guidance

Students can access the Department of Computer Science open labs from 8:00 a.m. to 8:00 p.m. Monday through Thursday, 8:00 a.m. to 5:00 p.m. on Friday, 12:00 p.m. to 5:00 p.m. on Saturday and 12:00 p.m. to 8:00 p.m. on Sunday. Students can also remotely access the Department application server via VPN 24 hours a day, 7 days a week.

D. Maintenance and Upgrading of Facilities

With assistance from the Information Technology Department, the Computer Science Department is responsible for maintaining and upgrading facilities. The Information Technology Department is responsible for switches and networking. Moreover, the Department is responsible for its own computer and software installed on the computer. During the 2012–2013 academic year, the University upgraded the Department switch to 10 Gigabyte bandwidth and re-cabled four computer labs, which upgraded the desktop bandwidth in those labs to 1 Gigabyte.

Each year the Department upgrades all computers in one or two computer labs as a regular refresh cycle.

The Department subscribes to the Microsoft Academic Alliance. Computer science students can freely download a wide variety of Microsoft software including development tools. The Department also maintains subscriptions for MatLab and Oracle database software. Software licenses are renewed regularly and computer equipment periodically.

E. Library Services

Lamar University's Mary and John Gray Library facilitates access to scholarly information in all formats. The Library has an integrated library management system, SIRSI/Dynix, which provides access to all print materials and specific segments of electronic resources available in the collection. All electronic resources are available via secure log-in through the databases section of the library webpage (<http://library.lamar.edu>) or through the EBSCOHost Discovery system, which provides integrated searching across all our digital resources. Conference Proceedings are available through IEEE CSDL and ACM Digital Library. The Mary & John Gray Library also subscribes to ENGNetBase. Articles from journals not held by the library can be obtained through document delivery services with very quick turnaround.

The library's book collection is organized using the Library of Congress Classification System, which automatically collocates the majority of Computer Science print collection together on one floor (5th).

1. Reference services available to students and faculty

There are four reference librarians and one documents/reference librarian who provide reference service. The reference desk is staffed a total of 80 hours each week. A paraprofessional also assists with the provision of reference service. Reference librarians are available in person to assist students during the following time slots: Monday - Thursday 8 a.m. – 8 p.m., Friday 8 a.m. – 4 p.m., Saturday 10 a.m. – 4 p.m., Sunday 2 p.m. – 8 p.m., for a total of 68 hours per week. Reference also answers questions via chat and SMS texts on Monday – Thursday 8 a.m. - 11:45 p.m., Friday 8 a.m. – 4 p.m., Saturday 10 a.m. – 4 p.m., and Sunday 2 p.m. - 11:45 p.m., for a total of 88 hours per week. A specialized student assistant helps those with hearing disabilities. In addition to reference services as listed above, library instruction sessions for specific classes are available by appointment.

Access to resources not owned by the library can be obtained through either document delivery or Interlibrary Loan (ILL). The ILL department provides an online request form on the library web page. The requests are checked by staff and processed immediately. Delivery can range from almost immediate for scanned items, such as journal articles, to up to two weeks for harder to get items.

Circulation/Reserves Department staff make textbooks and instructors' reading assignments available and provide standard circulation services, such as book checkout.

Other resources/services include nineteen large and small study rooms and self-service coin operated photocopy machines. The study rooms are each equipped with an Ethernet connection and power, as well as access to WiFi and can be used either for individual study or small group collaboration.

The research databases are accessible both on-campus and by remote access 24 hours a day, 7 days a week. The library's hours during the fall and spring semesters are: Monday-

Thursday: 7:30 a.m. - 11:45 p.m., Friday: 7:30 a.m. - 5:45 p.m., Saturday: 10:00 a.m. - 6:45 p.m., and Sunday: 2:00 p.m. - 11:45 p.m.

2. Library Staffing

The library is led by the Dean of Library Services. Functional departments include Circulation/Reserves, Instruction & Assessment, Reference, Special Collections & University Archives, Systems, and Technical Services. The Library is committed to the following initiatives: 1) Teaching information literacy skills that promote academic success and continuous learning; 2) Developing appropriate collections and making them discoverable; 3) Designing and delivering efficient services within a collegial educational environment; 4) Providing leadership in the creation of campus information policy. The library's administrative team is listed below:

Dean of Library Services

Dr. Arne Almquist, Ph.D., University of North Texas; M.S., University of North Texas; M.F.A., State University of New York

Circulation/Reserves

Kirk Smith, Interim Library Manager

Instructional Services and Assessment

Michael Saar, M.L.I.S., University of Arizona; M.A., University of Minnesota
Head of Instructional Services and Assessment

Reference

Karen Nichols, M.L.S., University of North Texas; M.S., Lamar University
Head of Reference

Special Collections and Lamar University Archives

Penny Clark, M.A. Emporia State University; M.A., University of Kansas
University Archivist

Systems

Poornima Gunasekaran, Interim Head of Systems

Technical Services

Sarah Tusa, M.L.I.S., University of Texas-Austin; M.A., Trinity University
Head of Technical Services

A complete list of staff and faculty is available online at:

<https://www.lamar.edu/library/about/facultystaff-directory.html>

3. Database computer search capabilities available to students and faculty

The Library subscribes to several electronic resources to facilitate research for undergraduates, graduates, and faculty of the Department of Computer Science. These include: ACM Digital Library, IEEE ASPP, IEEE POP ALL, Computer Abstracts, ENGNetBase, COMPENDEX, Science Citation Index.

Students and faculty may receive assistance using these resources from the librarians in the Reference area on the first floor of the Gray Library. Materials not available in a full-text format online are usually available in the Library's physical collection or from another library via our Interlibrary Loan service.

4. Library Technical Collection

Online reference works are acquired to provide support for patrons and reference staff to answer frequently asked questions. With any valid patron's Library Electronic Account (LEA), numerous online subscribed resources are available: electronic publications from the ACM Digital Library, Engineering Village, IEEE Xplore, IEEE All Proceedings Package (POP ALL), IMA Journal of Numerical Analysis, Information Science and Technology Abstracts, e-books through Netlibrary, and EBSCO's E-book Collection Manager (ECM), Proceedings First, Proquest Research Library (Proquest), Science and Technology Collection (EBSCOhost), Science Citation Index with access to Web of Science, Science Direct, and Academic Search Complete. A subscription to IEEE CSDL was added in 2015 and upgraded to POP ALL in 2015. Access is facilitated by the use of a library-managed proxy server that authenticates against the library management system database. Additionally, the Library's subscription to EBSCO Discovery System (EDS) allows students and faculty to search across multiple research databases simultaneously, thus streamlining the research process.

Existing and recently purchased e-books are especially useful for learning operating systems administration, database administration, networking protocols, data mining, artificial intelligence, office productivity applications, and technologies used for handling formats and data input.

5. Library Electronic Access

Gray Library's electronic resources are available 24 hours, 7 days per week from any computer on or off campus. All patrons must authenticate using campus provided ID usernames and passwords. Services are available via the Lamar University home page (<https://www.lamar.edu/>) or via the library's home page (<https://www.lamar.edu/library/>).

Wireless access is provided on each floor of the library to accommodate patrons using their personal devices. There are 34 PCs in the Reference area and 88 PCs in a computer lab on the 7th floor; 139 in total. In addition, there are 2 computers on the 1st floor that are equipped with accessibility software. Study rooms for group study are available on the fourth, fifth, and sixth floors. The study rooms provide personal computer access via Ethernet connections, WiFi, and electrical power outlets.

The SirsiDynix integrated library automation system is hosted by Lamar University's IT Department, as is the EZ-Proxy server. Other services, such as TiPasa and the EBSCOhost Discovery System, are cloud-based.

The library's PCs are Windows-based. All are equipped with Microsoft Office. Multiple browsers are provided, including MS Explorer, Firefox, and Chrome, with every available plugin that is known. Printing is available using a shared public printing system. There are plans to add several circulating laptops for student use.

Services include electronic resources, consisting of a long list of commercial and government documents web sites. Authentication is provided to the commercial databases with IP address range or username/passwords. A proxy service completes the remote connections to make it possible for all valid patrons to access the electronic resources from any PC.

E-Reserve is a service to classes with high demand materials. These materials are provided to the Library by the instructor in electronic form. When these materials are available to students, an email is sent to the instructor providing the authentication information. Of course, physical information sources are also available from the Reserves Department, but the online service is most popular.

The over 500,000 physical titles of the Gray Library are accessible through the use of an online catalog on the library website. The catalog uses keyword, author, title, and subject indexes. Searches may be done in a basic or advanced mode. The basic mode may be limited to putting in a search word or phrase and accepting the default search. An advanced search uses a combination of author, title, publication date, keyword, subject, material type, and call numbers to narrow searches.

The online catalog has features that allow patrons to check their personal account on the system that shows what they have checked out, what holds they have on library materials, if and how much their fines are, if any. Patrons are provided a generic personal identification number or word and are allowed to change it themselves once they have logged into the system. There are approximately 1000 computer-science-related journals available through the library.

Electronic Resources are provided by vendors who are called aggregators. Aggregators provide access to thousands of serial publications which include titles from trade and scholarly peer-reviewed journals and monographs. Below is a list of aggregators whose services are relevant to the study of Computer Science and are purchased either individually or as a member of a consortium. The Gray Library is a member of TexShare, a consortium managed by the Texas State Library and Archives Commission. As a member of the consortium, the Gray Library receives the core list of aggregators' databases. The lists of publications handled by each aggregator change occasionally, and an overlap in the contents of their services commonly occur. Also, differences exist in the quality of the content provided by vendors. A vendor whose product would be of the highest quality would provide indexing, abstracting and full- text content as it is published. A common practice for journal publishers is to restrict an aggregator from displaying content immediately upon publication. Supposedly this embargo increases the number of individual subscriptions sold and thus the revenue of the publisher. According

to the continuing negotiating powers of each aggregator, the quality of their journal title lists varies from one day to the next. The aggregator databases are used largely by the undergraduate student population, while the publisher-supplied databases, such as IEEE Explore and ACM Digital Library are more targeted resources for specific subject areas. The following is a list of publisher-supplied and aggregator databases:

- Academic Search Complete
- ACM Digital Library Core Package
- Business Source Complete I
- Computer Source
- IEEE All-Society Periodicals Package (ASPP)
- IEEE CSDL
- EBSCOhost e-books (formerly, Netlibrary)
- Professional Development Collection
- ProQuest Research Library
- Psychology & Behavioral Sciences Collection
- Science and Technology Collection
- ScienceDirect e-journals and e-books (Elsevier)
- WorldCat (OCLC)

The Mary & John Gray Library also contracts with W.T. Cox to provide an online index of the full-text journals subscriptions across all aggregators via Journal Finder. This service allows a user to enter the publication title and get a results list of aggregators that display the contents of the journals, and also serves as a link resolver that provides a direct link to the full-text article(s) that are available within a given database.

Additionally, the Gray Library subscribes to individual journal titles. Those journal titles are found in the Library's online catalog and on a finding tool that appears on the library's home page. Marc records for e-journals and e-books will have a URL linked to the full-text contents. With patron validation after clicking on the link, library users have full access from any computer capable of Internet service.

The tables below shows library expenditures in support of computer science, from academic year 2014 to 2019.

Table 7-1 Library Expenditures in Support of Computer Science AY14 – AY19

Year	Books	E-books	Journals	E-journals	Notes
AY14	\$35.99	\$0.00	\$0.00	\$12,201.07	Prices for E-journals are based on Computer Science titles in Elsevier's ScienceDirect.
AY15	\$707.27	\$5187.00	\$0.00	\$12,776.00	
AY16	\$0.00	\$5,452.00	\$0.00	\$13,448.00	
AY17	\$346.33	\$3,720.00	\$0.00	\$14,155.00	
AY18	\$41.95	\$1,995.00	\$0.00	\$14,822.00	
AY19	\$0.00	\$1,995.00	\$0.00	\$15,520.00	

Note: The figures for E-journals are in addition to the expenditures for publisher packages such as ACM Digital and IEEE ASPP, listed below.

Databases	
ACM Digital Library	\$6,525.00
IEEE ASPP	\$43,550.00
IEEE POP ALL	\$28,650.00
ENGNetBase	\$12,660.00
COMPENDEX	\$30,452.24
Science Citation Index	\$36,713.25
Computer Source	Provided through the TexShare statewide resource sharing program upon payment of Annual Participation Fee.

F. Overall Comments on Facilities

Lamar University is a public and open campus. No effort is made to restrain the public from entering the campus; however, the University Police Department reserves the right to bar individuals who are considered a threat to the well-being of the University community.

LUPD provides 24-hour patrol of campus property and facilities, and designated building coordinators establish and maintain access to their respective buildings. The campus is routinely inspected for environmental safety hazards such as insufficient lighting and overgrown shrubbery; however, members of the University community are encouraged to report locations of concern to University Police.

The Lamar University student resident community accommodates more than 2000 students in double occupancy suites with private bedrooms. Services and programs intended to enhance the quality of life and to ensure the security and safety of the residents are a major priority of the University. The Cardinal Village staff includes a full time Phase Director and several Community Assistants for each phase.

Security and safety policies and procedures, especially regarding locking individual rooms, building entrances and related precautions are discussed with residents in crime prevention seminars, in building meetings, and in printed materials which are posted and distributed. Thirty-two emergency phones have been placed at strategic locations on campus. Phones are on white posts with blue lights on top. When the red button is pushed, the location of the call is automatically identified, and the caller is connected to the police department. Locations of the telephones are marked on all parking maps and safety brochures. Individuals with hearing impairments should remain at the phone until an officer arrives.

Lamar University has a notification system to reach individual students via e-mail, voice messages and/or text messaging. Incoming students should verify their primary phone number with the Records Office. New employees should verify their primary phone number with Human Resources. The University has established a Public Address System for the central campus.

The office of Student Affairs, in conjunction with Lamar University Police, offers free shuttle service from 5:30 p.m. to 12:30 a.m. daily. Students utilizing this service must have a valid student I.D. The shuttle service provides transportation for students on campus and within the immediate vicinity of the campus. Students should call 880-2241 for this service.

Inside the Maes building an evacuation plan is posted on the walls at the two main entry doors. There is an automatic fire sprinkler system, 7 fire extinguishers on the first floor and 9 on the second floor. There are fire alarms and smoke detectors on both floors. Special evacuation equipment is located beside the elevator on the second floor for disabled persons to use the stairs in case of an emergency and the elevator is not functioning.

CRITERION 8. INSTITUTIONAL SUPPORT

A. Leadership

The Department Chair, Dr. Stefan Andrei, works with the Dean of College of Arts and Sciences, Dr. Lynn Maurer, and the Provost, Dr. James Marquart, to bring resources to the students, staff, and faculty of the Department of Computer Science. He is assisted by:

- Senior Administrator Associate, Mrs. Paula Gregory.
- Office Assistant, Mrs. Isha Vyas.
- Instructor and System Administrator, Mr. Qinguo (Frank) Sun.
- Technical Support Senior Analyst, Mr. Greg Yera.

The Chair leads all activities pertaining to the quality and continuity of the program, including, but not limited to:

- Maintaining and promoting high academic standards within the administration of the Department.
- Encouraging and supporting scholarship by the faculty and students.
- Maintaining departmental facilities, equipment, and administering budgets.
- Facilities Coordinator for the Maes Building.
- Overseeing and maintaining curricular standards and developing departmental schedules.
- Providing administrative leadership in personnel decisions relative to hiring, retention, promotion, tenure and merit pay.
- Faculty load (teaching, research/creative endeavors, and service) appropriate for the position.
- Supporting University and College policies.
- Other duties as required by the Department or assigned by the Dean.

Dr. Bo Sun is the Undergraduate Students Advisor. His main duty is to advise freshman and sophomore students in taking the courses needed for graduation. His supplementary work is compensated by one course release per year.

Dr. Timothy Roden is the ABET/SACS assessment coordinator for the Department. Duties of this assignment include responsibility for authoring all ABET-related reports and yearly SACS reports, all of which are posted on the Department website. His supplementary work is compensated by a salary stipend.

The Department has two permanent committees, the Assessment Committee and the Curriculum Committee.

Members of the Assessment Committee are as follows: Dr. Timothy Roden (Chair), Dr. Stefan Andrei, Dr. Jiangjiang Liu, Dr. Jing Zhang, and Dr. Lawrence Osborne. The task of

the Assessment Committee is to systematically gather and analyze the assessment data so that they can make recommendations to the faculty. These recommendations are discussed in faculty meetings.

Members of the Curriculum Committee are as follows: Dr. Lawrence Osborne (Chair), Dr. Stefan Andrei, Dr. Sujing Wang, Dr. Jing Zhang, and Dr. Timothy Roden. The task of the Curriculum Committee is to analyze the requests from faculty members regarding courses and to make recommendations. These recommendations are based on their experience, the 2013 Computer Science Curriculum made by Association of Computing Machinery (ACM), the Advisory Board members, the job market, and more. These recommendations are discussed and voted in faculty meetings.

The Department of Computer Science is one of twelve departments of the College of Arts and Sciences. Dr. Lynn M. Maurer joined Lamar University on July 1, 2018 as Dean of the college. Dean Maurer is strongly committed to supporting scholarly endeavors and increasing enrollment of high potential students. She continues to recognize outstanding students of Arts and Sciences during annual award ceremonies. Dean Maurer supports travel requests from faculty and staff, including travel to ABET conferences and workshops.

Provost Marquart has also been very supportive in numerous ways, by awarding one new position of a tenure-track faculty specialist in Cybersecurity, by supporting both Undergraduate Degree and Graduate Certificate in Cybersecurity, by allocating our department HEF funds for renovation of space to enable faculty to have laboratories for research, and additional funds to pay for release funds. In addition, he offered his support at various Computer Science-organized events, such as the Second Computer Science Career Forum in 2017 and Summer Camp Code for Girls in 2018.

In addition, support for our department came also from Dr. Paul Bernazzani, Acting Assistant Provost in charge of Science and Technology programs, recently opened on April 3, 2019. Dr. Bernazzani assigned a Laboratory space in the new Science and Technology building for investigating areas such as health connectivity, forensic and cyber security solutions coordinated by Dr. Xingya Liu, Dr. Sujing Wang and Dr. Jing Zhang, assistant professors in our department.

Furthermore, our department received support from Dr. Kenneth Evans, President of Lamar University, who joined our university in June 2013. He supported the STAIRSTEP Program, previously funded by National Science Foundation, for two more additional years until August 2016. Dr. Evans awarded some of our Faculty with the prestigious Lamar University Visionary initiatives as follows: Dr. Sujing Wang is a co-PI in a visionary grant titled “Flare and Abnormal Situation Management Research for Petroleum and Chemical Process Industries” (\$300,000) having Dr. Qiang Xu as the PI, and Dr. Stefan Andrei is a co-PI in the grant titled “A Center for Applications of Digital Technologies in Health and Disability” (\$240,000), having Dr. Monica Harn as the PI.

B. Program Budget and Financial Support

1. Budget Allocation Process

The department budget covers faculty and staff salaries, stipends for student assistants (graders and graduate research assistants), operations and travel funds. These funds are allocated to the department annually by the University. Typically the department would receive an amount of money for maintenance and operations that would be the same amount as the previous year. If the department wanted additional funds it would request them via memo to the Dean's office in the prior year.

Our department has 13 permanent faculty and 5 adjuncts, out of which 8 are tenured and 3 are tenure-track. Our department has 6 staff positions interacting with students, faculty, other staff members, as well as visitors.

The travel funds are adequate to support all the faculty domestic travel requests to conferences, but international/overseas travel requests need to have approval from the college and university administrators with 45 days in advance. Overseas travel requests should include a detailed itinerary and a justification of the conference ranking. In addition, several computer science faculty have their own research grants which allow them to use these funds for travel. In the last six years, our faculty have been awarded with more than \$1.2 million from the National Science Foundation.

Most laboratory equipment (computers, embedded systems, etc.) is acquired through special allocations of money designated primarily for hardware by the university to each department based on need. A justification is necessary for all equipment as well as at least three different vendor quotes. In addition, our Department is able to allow a replacement of instructional equipment on a three-year cycle.

The Department of Computer Science offers 3 permanent scholarships formed from donations, such as:

A. The Crawford/Lewis Scholarship in Computer Science

The Department of Computer Science at Lamar University awards the Crawford/Lewis Endowment Scholarship each spring semester to two incoming, or current students in the bachelor's program in Computer Science or Computer Information Science. The scholarship award is \$1200.00, and it is awarded in two payments, half in the fall semester and half in the following spring semester. Traditionally, at least one of the scholarships has been awarded to an academically exceptional incoming freshman. The main criteria is that the scholarship recipient must be, or intend to be, a full-time student in the Bachelor's of Science degree program in Computer Science or Computer Information Science. The Crawford/Lewis scholarship is for high school graduates and the criteria include: SAT or ACT scores, rank in class, extracurricular activities at school, and community service. The Scholarship can be granted to the same

student for a total of four academic years provided the student reapplies each year, maintains a GPA of at least 3.0 each semester, and is enrolled in a minimum of twelve semester hours each semester. Upon receiving more funds for this endowed scholarship, we were able to award 4 students in 2018-2019 academic year.

B. The Dr. William "Bill" Nylin Scholarship in Computer Science

The Department of Computer Science at Lamar University awards the Bill Nylin Scholarship each spring semester to an incoming, or current, student in the bachelor's program in Computer Science or Computer Information Science. The scholarship award is \$1200.00, and it is awarded in two payments, half in the fall semester and half in the following spring semester. This scholarship has been awarded to an academically promising student who has earned at least 15 university semester credit hours. The main criteria is that the scholarship recipient must be, or intend to be, a full-time student in the Bachelor of Science degree program in Computer Science or Computer Information Science at Lamar University. The Bill Nylin Scholarship can be granted to the same student for a total of three academic years provided the student reapplies each year, maintains a GPA of at least 3.0 each semester, and is enrolled in a minimum of twelve semester hours each semester. The main criteria for selection are as follows: GPA in Computer Science courses, number of credit hours, and letters of reference from faculty. We were able to award two undergraduate students with the Bill Nylin Scholarship in 2018-2019 academic year.

C. The Bobby Waldron Memorial Scholarship in Computer Science

This is a scholarship for students with at least 30 university semester credit hours. The preference is given for students with a GPA of more than 3.0 and who have finished the courses Programming Fundamentals I and Programming Fundamentals II. We were able to award one undergraduate student with the Bobby Waldron Scholarship in 2018-2019 academic year.

2. Teaching Support

Teaching is supported by the Department of Computer Science in at least two major ways. Firstly, all faculty are assigned graduate students to grade homework assignments, grade projects and prepare labs. Secondly, the STAIRSTEP program, our department, and the ACM Local Chapter support free tutoring for freshman and sophomore students. Tutors are junior and senior computer science students.

In addition, Lamar University has a strong commitment to student and faculty engagement in teaching and learning excellence. Under the direction of the Provost's Office, the Center for Teaching and Learning Enhancement (CTLE) supports faculty, administrators, graduate students, and staff in their academic pursuits and provides a range of instructional services to assist all members of the Lamar University teaching

community. CTLE helps through the following programs: workshops and seminars, faculty learning communities, evaluation, and assessment. Furthermore, CTLE will, on request, provides feedback about individual instructor's classroom performance. The evaluation methods involve one-on-one meetings, classroom observations, and confidential counseling.

3. Provision for Resources

The Department of Computer Science has six open labs for students, nine research labs, one GPU education lab, and one Gaming lab. There exist about 400 units of hardware equipment including computers, projectors, and printers, in the department's inventory list. As budgeted by the University, all computers in the open lab follow a three-year rotation schedule to keep updated. Upgrades to computers in faculty research labs come from instructor research funds supplemented by University HEAF funds. Below is a partial list of the software and hardware available in Department open labs. Note: some PCs have Windows 7 and some have Windows 10 installed. The university is in the process of phasing out Windows 7 support.

- Lab 214 (Windows 7 - 2 machines: Netbeans, Eclipse, PuTTY, Microsoft Office, Basic Micro Studio, MATLAB; Linux – 10 Machines: CentOS and Ubuntu; Macintosh – 10 Machines: Adobe Creative Suite, Eclipse, Netbeans, Microsoft Office);
- Lab 215 (Windows 7 – 24 Machines: Microsoft Office, Netbeans, Eclipse, MATLAB, Notepad++, PuTTY);
- Lab 212 (Windows 7 – 36 machines: MATLAB, Microsoft Office, Microsoft Visual Studio, Netbeans, Notepad++, Scratch, WinSCP, R studio, Eclipse, OpenScad, Stency);
- Lab 213 (Windows 10 – 26 computer machines: Adobe Creative Suite, Android SDK Tools, GameStudio A8, MATLAB, Microsoft Office, Microsoft Visual Studio, Netbeans, Notepad++, Scratch, WinSCP, Xming, Stency, Edipse);
- Lab 208 (Linux – 22 machines: CentOS);
- Lab 218 (Windows 7 – 20 Dell Alienware Game computers: Microsoft Office, Adobe Creative Suite, TimeLineFX, Lightwave 3D, Microsoft Visual Studio).
- Research Labs (Security Research lab: 5 Dell Alienware computers; Big Data Research lab: 12 Dell computers; Sensor Network lab: 10 Dell computers; Embedded Systems Lab: 7 Dell computers, five 3D printers, two 3D scanners; Database Research lab: 12 Dell computers; Computer Architecture Research lab: 8 Dell computers; Imaging Research lab: 10 Dell computers and 1 Mac computer).
- Department Servers (5 each Dell Server with Linux OS, 8 SUN servers, 1 DELL PowerVault Storage, 2 SUN Rack Tek 1000-42).
- The Department of Computer Science server room is in room 208C of the Maes building with dedicated AC unit. The department hosts a DELL PowerVault MD 3600 Storage with 20 Terabyte disk space. The department also hosts a department file server, application server, web, email, DNS, and database server

for teaching purposes. There are 2 DELL PowerEdge R620 servers, 3 DELL PowerEdge 640, and 3 SUN Fire servers.

- HPC cluster (2 Dell R640 head nodes and 46 computing nodes, 2 GPU nodes, and 1 big memory nodes; Linux CentOS 7, and Bright Computing management system) located in Reaud Honors College building. This cluster is open for all Lamar Faculty, Students and Staff.
- A 48in x 36in poster printer, laminator and cutter (located in our conference room, Maes 205). Our department will print and laminate academic posters for all Computer Science students, staff and faculty for free. In this way, they do not need to worry to look for an outside-LU sponsor. In fact, we help other departments with similar requests.

In addition, Maes Building has wireless access in all rooms and hallways.

4. Adequacy of Resources

The program has adequate resources to achieve all the student outcomes. The courses are offered at the required frequency to accommodate student needs, that is, mainly to ensure a timely graduation. We have a rotational scheme of courses offered in Spring and Fall semesters, as well as support to offer online courses. Summer courses are also offered and scheduled according to student needs.

The laboratories and computing equipment available in the department labs and university labs are adequate to support the Computer Science program.

C. Staffing

The Department has the following staff members hired for permanent positions:

- Ms. Paula Gregory, Senior Administrator Associate,
- Ms. Isha Vyas, Office Assistant,
- Mr. Qinguo (Frank) Sun, Instructor and System Administrator,
- Mr. Greg Yera, Technical Support Senior Analyst,
- Ms. Madison Boudreaux and Mr. Zechariah Mosteller, System Administrators,
- Mr. Krishnakanth Mamidipelly, WebMaster.

Ms. Gregory handles office activities and serves as the first contact for students, faculty, staff, and visitors to the Department. She also assists the Chair in scheduling and maintaining appointments, the Computer Science Department's Budget for faculty, graders, staff, the faculty's schedule, the Faculty Meetings Minutes, and all other administrative activities. She is helped by Ms. Vyas, who is also in charge of mail delivery and pickup, copier experience, and other administrative duties.

Mr. Sun and Mr. Yera handle all systems administration, equipment compliance, licenses, and other technical problems. Ms. Madison Boudreaux and Mr. Zechariah Mosteller assist them in monitoring the servers' activities. Mr. Krishnakanth Mamidipelly maintains the department's website (<http://cs.lamar.edu>) ensuring the content is updated and correct. In 2013 the University transitioned all web content to a new content management system (CMS). Mr. Mamidipelly, with direction from and the assistance of Dr. Roden transitioned the department webpage into the new CMS during 2013-2014.

All new employees attend an orientation by Lamar University's Human Resources Department during the first week of their employment. In addition, the university offers training of policies, rules, regulations, and practices on a regular basis, many of these every two years. Employees are required to take these courses by their supervisors.

Within the department, the Chair mentors the Administrative Associate. The Administrative Associate is knowledgeable in all academic activities, policies, and procedures of the Department of Computer Science, College of Arts and Sciences, and Lamar University. The Administrative Associate is the interface for the Department, students, faculty, and other staff.

The current Computer Science Staff members are exemplary employees. The Administrative Associate, the Office Assistant, the System Administrators, the Technicians, and the Webmaster form a great cooperating team in serving our students, staff, and faculty. In fact, many other departments from our building are helped by our professional staff, especially on urgent technical problems. All faculty and staff have access to necessary equipment, such as multiline telephone, facsimile machine, color and black/white printer, scanners, shredder, computers, and copiers. The students have access to the printers, computers, and scanners.

D. Faculty Hiring and Retention

1. Hiring Process for New Faculty

When faculty positions become open, they are advertised usually in *Communications of the ACM* and other online list-servers. The Department Chair appoints a Faculty Search Committee of at least three individuals. This committee selects the best five candidates and sends the list to the Chair which will be presented during the next Faculty Meeting. All faculty with the right to vote (e.g., for tenure track positions, only tenured and tenure track faculty are eligible to vote) will rank the candidates to determine the first three candidates that will be invited for an on-campus interview. Upon their arrival in three different days, the applicants will meet each faculty member and the Dean of College of Arts and Sciences. Based on the interview performance and subsequent faculty recommendations, an offer is to the finalist. It is the policy of the university to insure equal employment opportunity to all individuals. The university will seek to insure by all lawful means at its disposal that all prohibited discriminatory conditions in employment are eliminated and that employment policies do not operate to the detriment of any person on the grounds of non-relevant criteria including, but not limited to race, color, religion, sex, national origin, age, disability, or veteran status. The Human Resources Office will handle the orientation for each faculty and staff member.

The Department of Computer Science hired in August 2014 Dr. Jing Zhang, Ph.D. of South Florida, at the rank of Assistant Professor. He will be evaluated for tenure in 2020. His areas of expertise are image/video processing and analysis, medical image analysis, and computer vision. The same year, our department promoted Dr. Sujing Wang from Instructor in the non-tenure track to Assistant Professor in tenure track and she will be evaluated for tenure in 2020, too. Her areas of expertise are data mining and knowledge discovery, geographic information system, big data, and cloud computing. In addition, our department hired in August 2017 Dr. Xingya Liu, Ph.D. of University of North Carolina at Charlotte with the rank of Assistant Professor. His area of expertise is cybersecurity, next-generation wireless networks and fog computing and mobile. He will be evaluated for tenure in 2022.

2. Faculty Retention Strategy

New faculty members are awarded with start-up funds to support their research laboratories and teaching activities. Lamar University is very supportive in this respect. For example, one of the newest Assistant Professors, Dr. Jing Zhang, Dr. Sujing Wang and Dr. Xingya Liu, were given financial support of \$75,000 start-up grant to invest in modern equipment and research assistants for a period of three years. The students and faculty are delighted to have a new B.S. in Game Development program and a new B.S. in Cybersecurity program. In addition, Lamar University has a very competitive internal grant program called 'Research Enhancement Grant' of various funding levels: \$5,000, \$10,000, \$15,000, that can be used to cover travel expenses and student assistants. Typically, new faculty have been given priority for this program.

The typical teaching load is 9 hours per semester. A faculty who is awarded with an external grant gets a one course–release time for the duration of the grant. The College of Arts and Sciences as well as Lamar University have research, teaching, and advising awards recognizing meritorious faculty. In addition to using the grant funds, any faculty has the possibility to apply for travel funds to present their work at conferences. This is, in general, based on evaluation of each application, on a case-by-case basis.

The Department of Computer Science is proud to maintain a collegial environment. Members of our department celebrate holidays with parties or other related activities. For example, Students, Staff and Faculty are organizing the International Food Festival, an opportunity for each of us to meet and talk in a non-formal setting. Faculty and staff are generally unselfish in their service to the common objectives of our department. Within the larger domain of Lamar University, the relationship among faculty is very cordial, too. Interdisciplinary research and service throughout the University are common.

Another important event involving faculty is helping students organize the ACM Spring Banquet. Faculty help students to select a Distinguished Speaker for the event. In addition, the department assists the event by co-paying the incurred expenses, such as travel, hotel accommodation, lunch and dinner, and more. Furthermore, the department offers various awards to many students for academic performance, including best Freshman, Senior, and Graduate Student. The Lamar University Chapter of the ACM offers awards to student participants in the South Regional ACM Programming Collegiate Contest. This collegiate social event attracts generally the vast majority of students, faculty, staff, alumni, Advisory Board Members, and guests.

Beaumont is a mid-size city (approximately 120,000 population) with a low cost of living, easy access via Interstate 10 to large metropolitan areas, such as Houston and New Orleans, a local airport and a population known for its southern hospitality, Cajun music and cooking, and diverse ethnic backgrounds.

E. Support of Faculty Professional Development

Lamar University has an excellent activity known as the Faculty Development Leave. Development leaves (Texas' equivalent to sabbaticals) are vehicles for professional growth and represent supported leaves of absence from normal duties for the purpose of professional improvement. To apply, an applicant must have been a faculty member for at least two consecutive academic years. A faculty member is defined as a person employed by the institution on a full-time basis whose duties include teaching, scholarship, or administration. The Faculty Senate considers only applications from teaching and library faculty, since other advisory bodies consider leave requests from administrators (including department chairs) and staff.

Faculty may apply for a summer session leave (no pay, expenses only), a semester leave (full pay), or an academic year leave (half pay). A faculty member may NOT apply for leaves under more than one of the above categories during any given year, and identical

or strikingly similar project proposals will not be funded twice. Lamar University considers the following two main criteria for the Faculty Development Leave:

1. To what extent will the proposed activities improve the faculty member's teaching and/or ability to perform scholarly/research activity?
2. To what extent is a development leave necessary for the accomplishment of the proposed activities?

Dr. Peggy Doerschuk was awarded with a Faculty Development leave in 2016-2017 for performing research in deep learning and artificial intelligence areas. Lamar University provides an exceptional institutional support to the Department of Computer Science. The department enjoys generous support from the College, Provost and Administration as evidenced by the ongoing renovation of facilities, continuous upgrades to computing resources, hiring of new faculty, grants for travel and professional development and opportunities to expand the department into new areas of expertise and curriculum development such as the recent support of an initiative to develop a concentration in computer game development.

PROGRAM CRITERIA

The program satisfies ABET criteria as discussed in Section “Criterion 3 Student Outcomes.”

The 4 Program Educational Objectives are mapped to 7 Student Outcomes, as shown in Table 3-1. The 7 Student Outcomes are mapped to 9 Curriculum Outcomes, also shown in Table 3-1.

The 9 Curriculum Outcomes are each mapped to one or more required courses in the program as shown in the Curriculum Map in Appendix H. See Section “Criterion 3 Student Outcomes” for a full description of how the program satisfies the ABET criteria.

APPENDICES

Appendix A – Course Syllabi

The following course syllabi are listed, in order:

Required

- COSC 1172 Thinking, Speaking, and Writing
- COSC 1173 Programming Lab
- COSC 1174 Fundamentals Computing Lab II
- COSC 1336 Programming Fundamentals I
- COSC 1337 Programming Fundamentals II
- COSC 2336 Programming Fundamentals III
- COSC 2372 Computer Organization/Assembly Language
- COSC 2375 Discrete Structures
- COSC 3302 Introduction to Computation Theory
- COSC 3304 Introduction to Algorithm Design & Analysis
- COSC 3308 Survey of Programming Languages
- COSC 3325 Computer Law/Ethics
- COSC 4272 Senior Seminar
- COSC 4302 Introduction to Operating Systems
- COSC 4310 Introduction to Computer Architecture
- COSC 4333 Distributed Systems (*new course to be added in 2019-2020*)
- CPSC 4317 Computer Networks
- CPSC 4340 Database Design
- CPSC 4360 Software Engineering
- CPSC 4361 Secure Software Engineering
- CPSC 4363 Cybersecurity

Common Electives

- COSC 4319 Computer Graphics
- CPSC 4315 Network Systems Administration
- CPSC 4330 Multimedia Processing
- CPSC 4370 Introduction to Artificial Intelligence

Course Number and Name
COSC 1172 Thinking, Speaking, and Writing
Semester Credit Hours/Contact Hours per week
1/1
Instructor Name
Keith Mott
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Baase, S./ Henry, T. (2018). Gift of Fire, A: Social, Legal, and Ethical Issues for Computing and the Internet. (5th edition). Pearson Education. • Supplemental <ul style="list-style-type: none"> ○ Patt, Yale and Patel, S. (2003). Introduction to Computing Systems: From bits & gates to C & beyond. McGraw-Hill. ○ Lammers, S. (2006). Programmers at Work, Interviews with 19 Programmers Who Shaped the Computer Industry. Microsoft Press. ○ Asimov, I. (2004). I, Robot. Bantam Harper Edition. ○ Stoll, C. (1990). The Cuckoo's Egg: Tracking a Spy Through the Maze of Computer Espionage. Simon & Schuster. Shasha, D. and Lazere, C. (1998). Out of their Minds: The Lives and Discoveries of 15 Great Computer Scientists. Springer-Verlag.
Catalog Description
The objective of this course is to give students experiences that convey the five main activities of a person working in computer science: reading, listening, thinking, speaking, writing and cooperative interaction.
Prerequisites or Co-requisites
Co-requisite: COSC 1173 and COSC 1336.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>After completing this course, as measured by students' assignments and projects, students will be able to:</p> <ul style="list-style-type: none"> • think critically about ideas in the computer science field • summarize some of the issues related to the societal impact of information technology and the ethics of computer professionals • give examples of professional career opportunities in the field of computer science • develop his/her own ideas and express them effectively • demonstrate a point of view and develop it with awareness of alternatives • act as an entrepreneur in developing ideas for technology-based solutions to everyday needs

work in a remote team environment to produce results
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ Outcome 4, 5.3, 5.4, 5.5, 6, 7, 8 • Reinforce <ul style="list-style-type: none"> ○ None • Summative <ul style="list-style-type: none"> ○ None
List of Topics Covered
<ul style="list-style-type: none"> • Procedures and student policies for the computer science program at Lamar • Current roles and responsibilities for computer science professionals • Current economic, social and ethical issues in computer science • Introduction to student undergraduate research • Entrepreneurship • Writing skills • Critiques of professional papers • Working in teams • Presentations and final projects by students

Course Number and Name
COSC 1173 Programming Lab
Semester Credit Hours/Contact Hours per week
1/1
Instructor Name
Sujing Wang
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Liang, Y. D. (2017). Introduction to JAVA Programming. (Comprehensive Version, 11th edition). Pearson Education.
Catalog Description
Practical applications of concepts learned in Computer Science 1373 (COSC 1373). Hands-on instruction in programming in an object-oriented language, developing, debugging, and testing programming projects.
Prerequisites or Co-requisites
Co-requisite: COSC 1172 and COSC 1336.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
Students will be able to: <ul style="list-style-type: none"> Develop correct and efficient programs to implement software. Debug implemented software in a proficient manner.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> Introductory <ul style="list-style-type: none"> None Reinforce <ul style="list-style-type: none"> None Summative <ul style="list-style-type: none"> None
List of Topics Covered
<ul style="list-style-type: none"> Introduction to Computers, Programs, and Java. Elementary Programming. Selections. Loops. Methods. Single Dimensional Arrays. Multidimensional Arrays. Objects and Classed Object-Oriented Thinking

Course Number and Name
COSC 1174 Fundamentals of Computing II Lab
Semester Credit Hours/Contact Hours per week
1/1
Instructor Name
Kami Makki
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Liang, Y. D. (2017). Introduction to JAVA Programming. (Comprehensive Version, 11th edition). Pearson Education.
Catalog Description
This course is the lab which accompanies COSC 1337. The topics covered include advanced concepts of Java programming, such as inheritance, polymorphism, exceptions, graphical user interface, events-driven Programming, etc. Prerequisites: Minimum grade of "B" in COSC 1173 and COSC 1336.
Prerequisites or Co-requisites
Prerequisite: COSC 1173 and COSC 1337 with a grade of B or better.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<ul style="list-style-type: none"> Students will be able to: <ul style="list-style-type: none"> Create useful software architecture documentation. Develop correct and efficient programs to implement software and demonstrate a basic understanding of the concept of algorithm analysis. Debug implemented software in a proficient manner. Make appropriate choices in data, methods, style, structure, and information hiding while designing and constructing Object Oriented Programs.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> Introductory <ul style="list-style-type: none"> None Reinforce <ul style="list-style-type: none"> None Summative <ul style="list-style-type: none"> None
List of Topics Covered
<ul style="list-style-type: none"> Classes & Objects Inheritance & Polymorphism Exception Handling Abstract Classes Graphical User Interface Event-Driven Programming File I/O using text & binary files Java Generics Recursion

Course Number and Name
COSC 1336 Programming Fundamentals I
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Timothy Roden
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Liang, Y. D. (2013). Introduction to Java Programming. (Comprehensive Version, 9th Edition). Prentice Hall.
Catalog Description
Introduces the fundamental concepts of object-oriented programming. Topics include objects, class, polymorphism, exception handling, inheritance and interfaces. This course assumes computer literacy.
Prerequisites or Co-requisites
Co-requisite: COSC 1172 and COSC 1173.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Apply UML interaction diagrams and class diagrams to illustrate object models. Develop correct and efficient programs. Debug implemented software in a proficient manner. Develop user-level documentation for software. Fundamental programming techniques: data, expressions, branching, and loops. Fundamental data structures: primitive types, arrays, and strings. Basic Object-Oriented-Programming (OOP) techniques: classes, objects, and methods.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> Introductory <ul style="list-style-type: none"> 1.1,1.4,1.5,1.6,1.7 Reinforce <ul style="list-style-type: none"> None Summative <ul style="list-style-type: none"> None
List of Topics Covered
<ul style="list-style-type: none"> Introduction to Computers, Programs, and Java.

- Elementary Programming.
- Selections.
- Loops.
- Methods.
- Single Dimensional Arrays.
- Multidimensional Arrays.
- Objects and Classes.
- Strings.
- Thinking in Objects.

Course Number and Name
COSC 1337 Programming Fundamentals II
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Kami Makki
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Liang, Y. D. (2018) Introduction to Java Programming. (Comprehensive Version, 11th edition). Prentice Hall. • Supplemental <ul style="list-style-type: none"> ○ Lewis, J. and DePaquale P. (2016). Java Foundations: Introduction to Program Design and Data Structures. Addison-Wesley. ○ Gillay, C. (2003). Linux User's Guide Using the Command line and Gnome with Red Hat Linux. Franklin Beedle & Associates.
Catalog Description
Review of control structures and data types with emphasis on structured data types. Applies the object-oriented programming paradigm on Windows Platform, and focuses on the definition and use of classes along with the fundamentals of object-oriented design. It includes basic analysis of algorithms; searching and sorting techniques; and a brief introduction to software engineering.
Prerequisites or Co-requisites
Prerequisite: COSC 1336 with grade of “B” or better.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Create useful software architecture documentation. ○ Develop correct and efficient programs to implement software, and demonstrate a basic understanding of the concept of algorithm analysis. ○ Debug implemented software in a proficient manner. ○ Demonstrate familiarity with all primitive types in the language of choice, all commonly used control structures, simple user defined constructs such as enumerated types, low level programming tasks such as I/O, string manipulation, and array processing up to two dimensions. ○ Describe standard simple sorting algorithms such as the bubble sort, insertion sort, and selection sort. ○ Demonstrate familiarity with standard linear and binary search algorithms, as well as the

<p>simplest, array-based, linear data structures (stacks and queues).</p> <ul style="list-style-type: none"> ○ Make appropriate choices in data, methods, style, structure, and information hiding while designing and constructing Object Oriented Programs. ○ Demonstrate basic understanding of the Linux/Unix operating system. ○ Demonstrate basic understanding of more advanced language features such as recursion, polymorphism, exception handling, file I/O, UML, and inheritance.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ 1.7 • Reinforce <ul style="list-style-type: none"> ○ 1.1, 1.4, 1.5, 1.6 • Summative <ul style="list-style-type: none"> ○ None
List of Topics Covered
<ul style="list-style-type: none"> • Reviews topics from COSC 1336 • Inheritance & Polymorphism • Exception Handling • Abstract Classes • Graphical User Interface • Event-Driven Programming • File I/O using text & binary files • Java Generics • Searching (Linear search, Binary search) • Recursion (Direct, Indirect) • List, Stacks, Queues & Priority Queues

Course Number and Name
COSC 2336 Programming Fundamentals III
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Stefan Andrei
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Liang, Y. D. (2017). Introduction to JAVA Programming. (Comprehensive Version, 11th edition). Pearson Education.
Catalog Description
Further applications of programming techniques, introducing the fundamental concepts of data structures and algorithms. Topics include recursion, fundamental data structures (including stacks, queues, linked lists, hash tables, trees, and graphs), and algorithmic analysis.
Prerequisites or Co-requisites
Prerequisite: COSC 1337 with grade of “B” or better and MATH 2413 and COSC 2375.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Create useful software architecture documentation at the program, class, method, and block levels. Develop correct and efficient programs to implement software. Debug implemented software in a proficient manner. Demonstrate familiarity with searching and sorting algorithms for (non-)linear structures. Define and distinguish among frequently used discrete structures such as lists, trees, and graphs to computer science problems. Use elementary concepts of combinatorics, probability, and statistics to analyze and evaluate the efficiency of algorithms. Demonstrate basic understanding of time complexity. Design efficient algorithms and compare competing designs. Demonstrate basic understanding of some design approaches such as greedy algorithms, dynamic programming and divide-and-conquer.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> Introductory <ul style="list-style-type: none"> 1.3, 2.1.3, 2.2, 3 Reinforce <ul style="list-style-type: none"> 1.1, 1.4, 1.5

- Summative
 - 1.7, 2.1.1

List of Topics Covered

- Recursion.
- Generics.
- Lists, stacks, queues, and priority queues.
- Sets and maps.
- Developing efficient algorithms.
- Sorting.
- Implementing lists, stacks, queues and priority queues.
- Binary search trees.
- Hashing.
- Perfectly balanced (AVL) trees.
- Graphs and applications.
- Weighted graphs and applications.
- Multithreading and parallel programming.

Course Number and Name
COSC 2372 Computer Organization/Assembly Language
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Jing Zhang
Textbook, Supplemental Materials
Supplemental Materials: 1. Dr. Bradley Kjell, “Programmed Introduction to MIPS Assembly Language”, Central Connecticut State University, 2015 2. SPIM: A MIPS32 Simulator 3. MARS Tutorial
Catalog Description
Basic computer architecture and assembly language programming. System software, including loaders and assemblers. Input-output devices and programming.
Prerequisites or Co-requisites
None.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
Students will be able to: <ul style="list-style-type: none"> ○ Convert integers to and from other number bases than 10, primarily base 2 and base 16. ○ Demonstrate knowledge of hardware implementation of integers and basic arithmetic operations. ○ Demonstrate knowledge of the two's complement integer representation scheme. ○ Demonstrate general knowledge of floating-point implementation schemes and the primary characteristics of the IEEE 754 standard. ○ Demonstrate knowledge of how fundamental, high level language features such as strings, arrays, pointers, parameter passing mechanisms, functions return value mechanisms, and call-return are implemented in assembly language. ○ Program in a modern assembly language such as MIPS. ○ Identify RISC architectural characteristics and have a basic understanding of pipelined architectural design and implementation. ○ Use concepts of discrete mathematics such as Boolean algebra to explain the design of computer logic. ○ Use Karnaugh Maps to simplify the design of combinational and sequential circuits. ○ Design simple combinational and sequential circuits using basic gates and flip-flops.
Student Outcomes from Criterion 3 covered by this Course

- Introductory
 - 2.7.1, 2.7.3
- Reinforce
 - 1.5, 1.7, 2.1.3
- Summative
 - None

List of Topics Covered

- Number systems.
- Hardware representation of numeric data.
- Computer architectures.
- Integer Arithmetic and Memory Access
- Representing data using assembly language.
- Assembly language programming, branches, decisions, and loops
- Extended Assembly Language
- The stack and subroutine linkage
- Floating point data
- Boolean algebra and logic design
- Karnaugh Maps and sample combinational and sequential circuits.

Course Number and Name
COSC 2375 Discrete Structures
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Stefan Andrei
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Kenneth H. Rosen: Discrete Mathematics and Its Applications, ISBN-13: 978-0073383095, 7th edition, McGraw-Hill.
Catalog Description
This course presents discrete mathematical structures for computer science and mathematics. Topics included are: logic and methods of proof, structures of sets and functions, Boolean algebra, recursion, fundamentals of algorithms, permutations and combinations, discrete probability, graphs and trees, randomized search and optimization, and their applications.
Prerequisites or Co-requisites
Prerequisite: MATH 2312 or higher-level calculus-based Math course.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Upon completion of the course with a “C” or better, the student should be:</p> <ol style="list-style-type: none"> 1. Able to organize an argument and do proofs using rules of reference and by using mathematical induction. 2. Able to select an efficient algorithm for a given problem. 3. Able to solve basic problems in number theory. 4. Able to calculate permutations, combinations, and discrete probability. 5. Able to build a relation from a relationship in the real world and determine the properties of a relation. 6. Able to use graphs to represent different application problems such as computer networks. 7. Able to use a tree as data structure to maintain dynamic data. 8. Able to use discrete structures to mathematically model real-world problems.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> Introductory <ul style="list-style-type: none"> 2.1, 2.2, 2.2.1, 2.2.4 Reinforce <ul style="list-style-type: none"> none Summative <ul style="list-style-type: none"> None
List of Topics Covered
<ul style="list-style-type: none"> Propositional Logic Predicate Logic

- Proofs
- Basic Structures
- Algorithms
- Number Theory and Cryptography
- Induction and Recursion
- Counting
- Relations

Course Number and Name
COSC 3302 Introduction to Computation Theory
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Hikyoo Koh
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Martin, J. C. (2011). Introduction to Languages and the Theory of Computation (4th Edition). McGraw Hill • Supplemental <ul style="list-style-type: none"> ○ Hein, J. L. (1996). Theory of Computation: An Introduction. Jones and Bartlett Publishers ○ Davis, M. D. (1994). Computability, Complexity, and Languages (2nd edition). Academic Press, 1994.
Catalog Description
Preliminary review/introduction of the mathematics and logic for the course. Programs and computable functions, primitive recursive functions, the universal program, Turing machines and regular languages.
Prerequisites or Co-requisites
Prerequisite: COSC 1337, MATH 2414 and MATH 2318.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Acquire clear understanding of foundation and principles of computer science such as (a) what computers can do, (b) what computers cannot do, (c) relationships and equivalences among different types of grammars, languages and accepting machines, (d) limits of algorithmic computation, and (e) differences and equivalences between determinisms and non-determinisms in various computing models. ○ Acquire clear understanding of regular grammars, regular languages and finite-state acceptors. ○ Acquire clear understanding of context-free grammars, context-free languages, and non-deterministic push-down acceptors. ○ Acquire clear understanding of phrase-structured grammars, recursively enumerable languages and Turing machines. ○ Acquire basic understanding of computational complexity pertinent to different levels of difficulties in solving computer-related problems.
Student Outcomes from Criterion 3 covered by this Course

- Introductory
 - None
- Reinforce
 - 1.7, 2.1.3
- Summative
 - 2.3.1, 2.3.2, 2.3.3, 2.3.5

List of Topics Covered

- Unit-1: Logic and Finite Automata and Regular Expressions.
 - Binary Relations.
Properties of Binary Relations: Reflexive, Symmetric, Transitive.
Equivalence Relations: Equivalence Classes, Partitions.
 - Formal Logic.
Propositional Logic and Normal Forms.
Predicate Calculus.
 - Regular Languages and Finite State Automata Equivalence.
Regular Languages, Regular Expressions, Deterministic FA, Nondeterministic FA.
Closure Properties.
Pumping Lemma.
- Unit-2: Context-Free Languages and Pushdown Automata.
 - Context-free Languages.
Derivation Trees and Ambiguity.
Normal forms.
 - Non-deterministic Pushdown Automata.
Deterministic Pushdown Automata (Special cases).
Pumping lemma.
Closure properties and Decisions Problems.
Parsing Techniques.
- Unit-3: Non-Context-Free Languages and Undecidable Problems.
 - Programs and Computable Functions.
Simple Programming Language.
Partially computable functions.
Total functions.
Computable functions and Primitive Recursive functions.
Universal Functions.
Macros.
 - Turing Machines.
Quadruples and Quintuples.
Universal Turing Programs.
TM Halting Problems and Problem Reduction.
Undecidable Problems, Limits of Computing.
Nondeterministic TM.

Course Number and Name
COSC 3304 Introduction to Algorithm Design & Analysis
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Larry Osborne
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required Algorithms, 4th Edition Deluxe by Robert Sedgewick and Kevin Wayne. (Pearson Education, Inc. 2016, ISBN 978-0-13-438468-9). 2009. Required Algorithms Illuminated, Part1: The Basics, by Tim Roughgarden, Soundlikeyourself Publishing, LLC. ISBN: 978-0-9992829-0-8 (Paperback).
Catalog Description
<p>This course will provide a rigorous introduction to the design and analysis of algorithms. We will discuss classic problems (e.g., sorting, traveling salesman problem), classic algorithm design strategies (e.g., divide-and-conquer, greedy approaches), and data structures (e.g., hash tables, trees, and graphs) used to solve these problems. The course emphasizes the relationship between algorithms and programming and introduces basic performance measures and analysis techniques for these problems. We will also analyze algorithm complexity throughout, and touch on issues of tractability such as "NP-Completeness". We provide an introduction to mathematical modeling of computation problems.</p>
Prerequisites or Co-requisites
Prerequisite: COSC 2336
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Choose between Exact and Approximate Problem Solving Design an algorithm and employ the data structures needed to create an efficient implementation of the algorithm Describe, compare, and contrast common sorting and searching algorithms Analyze an algorithm to determine its complexity using the properties of logarithms, combinatorics, summation formulas, and common recurrence relations in algorithmic analysis including generating functions Use and understand the orders of growth of algorithms, worst-case, best-case, and average-case efficiencies

- Use the Decrease-and-Conquer Strategy for generating permutations and subsets and doing topological sorting
- Employ arrays, graphs, linked lists, trees, sets and dictionaries as data structures
- Use Divide-and-Conquer Strategy for Quicksort, Multiplication of large integers, and the convex-hull problem
- Describe space and time trade-offs in string matching, hashing and B-Trees
- Describe dynamic programming methods for the Knapsack Problem and Optimal Binary Search trees.
- Implement and use greedy algorithms for spanning trees.
- Describe the algorithms in the textbook for sorting strings, and for searching for substring (these include the Knuth-Morris-Pratt algorithm, Boyer-Moore algorithm, and the Rabin-Karp fingerprint algorithm.
- Describe the limitations of algorithms including P versus NP problems, and NP-Complete problems

Student Outcomes from Criterion 3 covered by this Course

- Introductory
 - None
- Reinforce
 - 1.3, 1.7
- Summative
 - 1.4, 1.5, 2.1.2, 2.2

List of Topics Covered

- Analysis basics.
 - Big Oh, big Omega, and big Theta notations.
 - Recurrence relations and their solution.
 - Rates of growth: worst, average and amortized analysis.
 - Analysis as a Design Tool.
- Designs and analysis of divide-and-conquer algorithms.
 - Analyzing recursive algorithms.
 - Recurrence relations.
 - Closest pair.
 - Convex hull.
- Designs and analysis of searching and sorting algorithms.
 - Optimal searching and sorting algorithms.
 - Priority Ques and Heaps, Heapsort.
 - Quicksort.
 - Sorting in Linear Time.
- Designs and analysis of graph algorithms.
 - Depth-first traversal algorithms.
 - Breadth-first traversal algorithms.
 - Minimum spanning tree.
 - Shortest path algorithms.
- Advanced designing techniques: Dynamic Programming and Greedy Algorithms.

- Traveling salesperson approximation/matrix chain.
- Fibonacci numbers and binomial coefficients.
- All-pair shortest path algorithm.
- Designs and analysis of parallel multi-core algorithms.
 - PRAM model.
 - Simple parallel operations.
 - Matrix multiplication, Gaussian elimination.
 - Parallel searching.
 - Parallel sorting.

Course Number and Name
COSC 3308 Survey of Programming Languages
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Stefan Andrei
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Roy, P. V. and Haridi, S. (2004).: Concepts, Techniques, and Models of Computer Programming. MIT Press. • Supplemental <ul style="list-style-type: none"> ○ Tucker, A. and Noonan, R. (2002). Programming Languages. Principles and Paradigms, McGraw Hill.
Catalog Description
The organization of programming languages, especially run-time behavior of programs; the formal study of programming language specification and analysis, and the continued development of problem solution and programming skills.
Prerequisites or Co-requisites
Prerequisite: COSC 2336.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Demonstrate basic understanding and appreciation of the various essential programming-languages constructs, programming paradigms, evaluation criteria, and language implementation issues. ○ Demonstrate basic knowledge and skills in programming languages concepts and corresponding programming techniques with the focus on concepts and not on a language. ○ Apply simulation and experimentation of programming techniques in terms of simple (visual) abstract machine. ○ Demonstrate knowledge of limitations of computational capability of computer grammars.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ None • Reinforce

- 1.2, 1.7, 2.3.3, 2.3.5
- Summative
 - 2.3.6, 2.3.7

List of Topics Covered
<ul style="list-style-type: none">• Declarative computation model.• Declarative programming techniques.• Declarative concurrency.• Message-passing concurrency.• Explicit state.• Object-oriented programming.• Relational programming.• Constraints programming.

Course Number and Name
COSC 3325 Computer Law/Ethics
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Stefan Andrei
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Sara Baase: (2018) A gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet, ISBN: 978-0134615271, 5th Edition (Fourth edition, 978-0132492676, and third edition, ISBN 978-0136008484, are also good). • Supplemental <ul style="list-style-type: none"> ○ Zobel, J. (1997). Writing for Computer Science, Springer. ○ Reynolds, G. (2011). Ethics in Information Technology. (4th edition). Cengage Learning.
Catalog Description
Ethical considerations for computer educators and computer scientists, and computer-related security and privacy issues. Copyright, patent, trademark and trade secret issues, venture capitalists, tax issues, computer torts, deceptive trade practices, computer crime, contract issues, constitutional issues and international trade considerations.
Prerequisites or Co-requisites
Prerequisite: COSC 1336 or COSC 1371 or another programming course.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Think critically and ethically about computer science field. ○ Discover and investigate relevant lawful information in order to gain knowledge and solve problems. ○ Analyze information and ideas using appropriate methods; to ethically generate his/her own ideas and express them effectively orally and in writing. ○ Deliver an ethical point of view and develop it with awareness of alternatives.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ None • Reinforce <ul style="list-style-type: none"> ○ 1.7, 8 • Summative

- 4, 5, 7, 9.1

List of Topics Covered

- An introduction to the ethical style of good writing in computer science.
- The social, legal, philosophical, and economic issues related to computers that members of a technological society might face in their professional and civic lives.
- The copyright laws/issues and model ethical acquisition and use of digital information, citing sources using established methods.
- The proper etiquette and knowledge of acceptable use policies when using networks, especially resources on the Internet and Intranet.
- The measures, such as passwords or virus detection/prevention, to protect computer systems and databases from unauthorized use and tampering;
- The impact of computer programming on the World Wide Web (WWW) community.

Course Number and Name
COSC 4272 Senior Seminar
Semester Credit Hours/Contact Hours per week
2/2
Instructor Name
Stefan Andrei
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Martin Roden and Teresa Murhpy. Writing and Speaking for Technical Professionals, Paperback: 263 pages, Publisher: Discovery Press; 2009, ISBN-13: 978-0-9793487-3-0.
Catalog Description
<p>This course is to assist students in their preparation for searching for a permanent position after graduation or in their application for a more advanced graduate degree. In addition, the Department of Computer Science will survey the experiences of students completing their degrees as part of its assessment obligations as an ABET accredited program. The only test that will be given is the ETS examination to measure the understanding of computer science of our students relative to national norms. This means that whatever scores are made on the test is confidential and does NOT affect the grade received for COSC 4272.</p>
Prerequisites or Co-requisites
None.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Start a job search for a permanent position in computer science. Assess their most marketable skills and strengths. Develop a resume. Speak about themselves in an interesting and informative way. Work with recruiters. Target and contact potential employers. Describe the advantages of graduate school. Develop a plan for Lifelong Learning. Design a computer solution for an unfamiliar problem.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> Introductory <ul style="list-style-type: none"> None Reinforce <ul style="list-style-type: none"> 1.7, 8 Summative

○ 7, 9

List of Topics Covered

- Importance of communication skills
- Student writing
- Professional writing
- Beginning a communications project
- Oral communication and job hunting
- Rules and tools
- Writing a document
- Other document components and features

Course Number and Name
COSC 4302 Introduction to Operating Systems
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Bo Sun
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Nutt, G. (2003). Operating Systems. (3rd edition). Addison Wesley. Robbins, K. A. and Robbins, S. (2015). UNIX Systems Programming: Communication, Concurrency and Threads: Communication, Concurrency and Threads (2nd Edition). Prentice Hall.
Catalog Description
This course will introduce the design and implementation of operating systems. The operating system provides a convenient and efficient interface between user programs and the hardware of the computer they are running on. OS is responsible for sharing resources, providing common services needed by different programs, and protecting individual programs from interfering with one another. Students will learn to analyze and design a software solution and implement a software design specification using C language.
Prerequisites or Co-requisites
Prerequisite: COSC 2336.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Master fundamental concepts of operating systems, such as device management, process management, memory management, and file management. Understand device drivers and I/O management, such as polling and Interrupt-driven I/O operations. Understand process management, such as abstract machines, address space, context switch, process, thread, state transition diagram, and resource models. Understand memory management such as virtual memory, segmentation, paging, and swapping. Understand file management, such as basic read and write file operations. Understand CPU scheduling, such as design and implementation of scheduler, preemptive scheduling policies, and non-preemptive scheduling policies. Understand basic and high-level synchronization principles, such as critical section, deadlock, binary semaphore, general semaphore, Bounded-Buffer Problem, Dining Philosopher Problem, monitor, conditional variable, signals, and basic Inter-Process

<p>Communication.</p> <ul style="list-style-type: none"> ○ Develop corresponding programs using Unix system calls and program with the Unix/Linux operating system, such as fork(), signal(), pthread_create(), fopen(), sleep(), sem_init(), and wait(). ○ Analyze software development problems, design and implement software solutions, and write technical reports. There will be a term project, in which a complex problem will be analyzed, designed, implemented, and documented.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ None • Reinforce <ul style="list-style-type: none"> ○ 1.3, 1.7, 6 • Summative <ul style="list-style-type: none"> ○ 2.4, 8
List of Topics Covered
<ul style="list-style-type: none"> • The design and implementation of operating systems. • Analyze and design a software solution. • Implement a software design specification using C language.

Course Number and Name
COSC 4333 Distributed Systems
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Bo Sun
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Tanenbaum, Andrew and Van Steen, Maarten. (2007). Distributed Systems: Principles and Paradigms. (2nd edition). Prentice Hall.
Catalog Description
<p>This course will explore the fundamental issues in designing and implementing distributed system. Various software components of the communication and interconnection architecture of multiple computer systems are introduced. Specifically, we will study the architectures of distributed systems, processes and threads, interprocess communication and synchronization, name solution, data consistency and replication, and fault tolerance. We will also discuss representative distributed computing systems and file systems to help understanding these topics. Student will learn to analyze and evaluate the performance of distributed systems and to understand the inherent tradeoffs of distributed system design.</p>
Prerequisites or Co-requisites
Prerequisite: COSC 4302
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Understand distributed system architecture (how the various software components are organized and how they interact), such as traditional centralized architecture, and decentralized peer-to-peer architecture. Network File Systems (NSF) and Web Systems will be used as examples to help understand these concepts. Understand process and threads, virtualization, client-server organizations, and code migration. Apache Web Servers will be used as examples to help understand these concepts. Study interprocess communication, Remote Procedure Call (RPC) and Message-Oriented Middle (MOM) and multicasting. Study name resolution and how a naming system is implemented. We will study flat naming, structured naming, and attributed-based naming. Domain Name Systems (DNS), NFS, and Lightweight Directory Access Protocol (LDAP) will be used as examples to help understand these concepts. Study how processes can synchronize and coordinate. We will study clock synchronization, logical clocks, and mutual exclusion, election algorithms, and location

<p>algorithms.</p> <ul style="list-style-type: none"> ○ Study consistency and replication. We will study data-centric consistency models, client-centric consistency models, and management of replica. Caching and replication in the Web will be used as examples to help understand these concepts.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ None • Reinforce <ul style="list-style-type: none"> ○ 1.3, 1.4, 1.6, 1.7, 2.4.4, 4.2, 4.3, 5.3 • Summative <ul style="list-style-type: none"> ○ 2.6.1, 2.6.2, 2.6.3, 3.1, 3.2, 3.3, 3.4
List of Topics Covered
<ul style="list-style-type: none"> • Distributed architecture • Processes and threads • RPCs • DNS • LDAP • Apache servers

Course Number and Name
COSC 4310 Introduction to Computer Architecture
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Jiangjiang Liu
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Patterson, D. A., and Hennessy, J. L. (2011). Computer Organization & Design: The Hardware/Software Interface. (4th edition). Morgan Kaufmann Series. • Supplemental <ul style="list-style-type: none"> ○ Patterson, D. A., and Hennessy. (2006.) Computer Architecture: A Quantitative Approach. (4th edition). Morgan Kaufmann Series.
Catalog Description
<p>This course is an introduction to computer architecture, with a special focus on the principles behind contemporary uniprocessor design. It will explore the interaction of hardware and software and consider the efficient use of hardware to achieve high performance. Topics will include instruction set architecture, computer arithmetic, processor design, performance measurement and analysis, pipelining, caches and virtual memory, high performance MIPS implementation, parallel processors, and design tradeoffs among cost, performance and complexity.</p>
Prerequisites or Co-requisites
Prerequisite: COSC 2336, COSC 2372
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Explain abstractions: Applications software, systems software, assembly Language, Machine Language, etc. ○ Understand modern ISA design principles and employs them to evaluate systems. ○ Design instruction set architecture and explain the principles using MIPS instruction set as a real system example. ○ Have knowledge on arithmetic of a modern processor, such as sign and unsigned numbers, addition, subtraction, floating point, and so on. ○ Demonstrate knowledge of hardware implementation of numbers and arithmetic operations ○ Know how to evaluate performance for different computer architectures by using execution time and MIPS. ○ Describe how the instructions are executed and different datapath and control

<p>implementation schemes.</p> <ul style="list-style-type: none"> ○ Explain how the performance can be improved with pipelining, and what the major pipeline design concerns are. ○ Have comprehensive knowledge on the design of memory system hierarchies, how virtual memory works, and how to measure and improve memory system performance. ○ Use simulations to analyze computer architectures. <ul style="list-style-type: none"> ○ Be able to justify why selected simulation methods were chosen and state intended outcomes of the study. ○ Identify steps used in simulations. ○ Be able to outline and explain the key features of simulation approaches. ○ Analyze and interpret collected experiment data and draw appropriate conclusions. Evaluate performance for different computer architectures by using execution time and MIPS. ○ Describe how the instructions are executed and different datapath and control implementation schemes. ○ Explain how the performance can be improved with pipelining and the major concerns about pipeline design. ○ Know the design of memory system hierarchies, how virtual memory works, and how to measure and improve memory system performance. ○ Use simulations to analyze computer architectures. ○ Justify why selected simulation methods were chosen and to state intended outcomes of the study. ○ Identify steps used in simulations. ○ Outline and explain the key features of simulation approaches. ○ Analyze and interpret collected experiment data and draw appropriate conclusions. ○ Justify why selected simulation methods were chosen and to state intended outcomes of the study. ○ Identify steps used in simulations. ○ Outline and explain the key features of simulation approaches. ○ Analyze and interpret collected experiment data and draw appropriate conclusions.
<p>Student Outcomes from Criterion 3 covered by this Course</p> <ul style="list-style-type: none"> ● Introductory <ul style="list-style-type: none"> ○ None ● Reinforce <ul style="list-style-type: none"> ○ 1.7 ● Summative <ul style="list-style-type: none"> ○ 2.7, 3
<p>List of Topics Covered</p> <ul style="list-style-type: none"> ● Computer abstractions and technology. ● Cost and performance analysis. ● Instruction set architecture. ● Computer arithmetic. ● Datapath and controller design. ● Pipelining and memory systems.

Course Number and Name
CPSC 4317 Computer Networks
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Bo Sun
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Comer, D. E. (2014). Computer Networks and Internets. (6th edition). Prentice Hall.
Catalog Description
<p>This course will introduce the fundamental networking concepts and their applications. We will provide a comprehensive tour through all aspects of networking including data transmission and wiring, network technologies, internetworking protocols, and application software. We will introduce socket programming and software implementation of relevant protocols and algorithms. We will also show how applications use software protocol stacks to provide functionality for users. We will also introduce important ethical issues of computer networks.</p>
Prerequisites or Co-requisites
Prerequisite: COSC 2336, COSC 4302.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Master fundamental concepts of computer networks and their applications - OSI layers, Telnet, Secure Shell, and WWW. Understand Socket Programming and Develop Basic Network Protocol Software and Algorithms, such as socket(), bind(), listen(), accept(), send(), and recv(). Understand Network Layers – Physical layer, Data Link Layer, Network Layer, Transport Layer, and Application Layer. Understand Fundamentals of Data Transmission. Understand Local Area Networks (LANs) and data link protocols – Carried Sense Multiple Access / Collision Detection, 802.3, Spanning Tree Algorithm. Understand Internetworking, IP, TCP and UDP – Packet Format, IP Address, IP Packet Forwarding, IP Encapsulation, Fragmentation, and Reassembly, CIDR, Port, TCP Flow Control, and TCP Congestion Control. Understand Routing – Distance Vector Routing, Link State Routing, RIP, OSPF, and BGP. Understand Client-Server Interaction. Understand High-level network services: DNS, FTP, HTTP, SNMP.

<ul style="list-style-type: none"> ○ Understand the basic concepts of Network Security, Secret Key, Public/Private Key, and Hash. ○ Perform Simulation of Network Protocols – Metric to evaluate protocol performance, and simulation of networking protocols. ○ Understand Ethical Issues of Computer Networks – hacking and computer crimes, identity theft, Anonymity, Intellectual Property, Censorship, and related laws, and related cases.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ None • Reinforce <ul style="list-style-type: none"> ○ 1.3, 1.4, 1.6, 1.7, 2.4.4, 4.2, 4.3, 5.3 • Summative <ul style="list-style-type: none"> ○ 2.6, 3
List of Topics Covered
<ul style="list-style-type: none"> • Fundamental networking concepts and their applications. • Data transmission and wiring. • Network technologies. • Internetworking protocols. • Application software. • Socket programming. • Software implementation of relevant protocols and algorithms. • Software protocol stacks. • Ethical issues of computer networks.

Course Number and Name
CPSC 4340 Database Design
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Kami Makki
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Elmasri, E., and Navathe, S. B. (2017). Fundamentals of Database Systems. (7th edition). Addison Wesley. • Supplemental <ul style="list-style-type: none"> ○ Shah, N. (2004). Database Systems Using Oracle. (2nd edition). Prentice Hall. ○ Ricardo, C. and Susan D. Urban (2015). Databases Illuminated. (2nd edition). Jones & Bartlett Publishing.
Catalog Description
Logical and physical database system organization; logical models; design issues; secondary storage considerations. Design issues emphasizing the normal decomposition theory of the n-ary relational data model, the RM/T model and an introduction to logical implementations of databases.
Prerequisites or Co-requisites
Prerequisite: COSC 2336 and MATH 2318.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Design and implement a working database system for a real-world project. ○ Write data manipulation statements in SQL to query and maintain a database. ○ Use mathematical and theoretical underpinnings of database systems. ○ Determine and handle the major operational issues associated with database management systems such as issues related to database design and queries.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ None • Reinforce <ul style="list-style-type: none"> ○ 1.7 • Summative <ul style="list-style-type: none"> ○ 1.3, 2.5, 6

List of Topics Covered
<ul style="list-style-type: none"> • Architecture of database systems. • Logical and physical database system organization. • Relational models. • Entity-relationship models. • Secondary storage. • Fundamental knowledge required to design and manipulation database. • Security issues. • Design issues emphasizing the normal forms and decomposition theories.

Course Number and Name
CPSC 4360 Software Engineering
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Stefan Andrei
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Priestly, M. (2004.: Practical Object-Oriented Design with UML, McGraw Hill. • Supplemental <ul style="list-style-type: none"> ○ Wadhwa, B., Andrei, S. and Jien, S. Y. (2007). Software Engineering: An Object-Oriented Approach. McGraw Hill. ○ Sommerville, I. (2011). Software Engineering (9th edition). Addison Wesley. ○ Larman, C. (2011). Applying UML and Patterns. Prentice Hall. ○ Binder, R. (2000). Testing Object-Oriented Systems, Addison Wesley.
Catalog Description
Systems analysis, software requirements analysis and definition, specification techniques, software design methodologies, performance measurement, validation and verification and quality assurance techniques.
Prerequisites or Co-requisites
Prerequisite: COSC 2336.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Analyze and design medium and large software projects. ○ Implement the project in Java (or C++) programming language. ○ Test the project using various methods.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> • Introductory <ul style="list-style-type: none"> ○ None • Reinforce <ul style="list-style-type: none"> ○ 1.3, 2.5.2 • Summative <ul style="list-style-type: none"> ○ 1.1, 1.2, 1.6, 1.7, 4.4, 5.2, 6, 8
List of Topics Covered

- Introduction to Software Engineering.
- Software Development Models.
- Use Case and Domain Modeling.
- Object-Oriented Analysis.
- Design (class and object diagrams, class generalization and association classes, interaction diagrams).
- State Diagrams.
- Design Patterns.
- Design to Implementation and Essentials of Java Programming Language.
- Software Testing and Automated Test Driver; Test Case Design.
- Professional Ethics, Responsibilities, and Social Implications of Software Engineering.

Course Number and Name
CPSC 4361 Secure Software Engineering
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Stefan Andrei
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Fred Long, Dhruv Mohindra, Robert C. Seacord, Dean F. Sutherland, David Svoboda. <i>Java coding guidelines: 75 recommendations for reliable and secure programs</i>, The SEI series in software engineering, 2014, ISBN 978-0-321-93315-7
Catalog Description
This course covers five main secure software engineering topics, such as security, defensive programming, reliability, program understandability and programmer misconception.
Prerequisites or Co-requisites
Prerequisite: CPSC 4360 Software Engineering with grade of “C”.
Required, Elective or Selected Elective (as per Table 5-1)
Required
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Examine software programs to determine software security threats. Apply defensive programming strategies and modify object-oriented software code to eliminate software security threats. Design the proper documentation of previous security breach in the software system.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> Introductory <ul style="list-style-type: none"> none Reinforce <ul style="list-style-type: none"> none Summative <ul style="list-style-type: none"> 1.4. Develop correct and efficient programs 1.5. Debug implemented software in a proficient manner
List of Topics Covered
<ul style="list-style-type: none"> Software security Defensive programming Software reliability Program understandability Programmer misconceptions.

Course Number and Name
CPSC 4363 Cybersecurity
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Xingya Liu
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Recommend <ul style="list-style-type: none"> Michael Goodrich, Roberto Tamassia: Introduction to Computer Security. Pearson (1st Edition), 2011 Wenliang Du: Computer Security: A Hands-on Approach. CreateSpace Independent Publishing Platform (1st Edition), 2017
Catalog Description
Topics include malware, privacy, network attacks and defenses, operating system security, application security (web, email, databases, etc.), cryptography, and the security issues on some hot topics, such as quantum encryption, blockchain, and Internet of Things.
Prerequisites or Co-requisites
Prerequisite: COSC 2336.
Required, Elective or Selected Elective (as per Table 5-1)
Selected Elective
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Identify the nature of threats and vulnerabilities in most software, networks, systems, webs, and applications. Analyze a network intrusion, breach, or attack, and then design methods for its secure protocol. Secure systems that are not vulnerable to application program attack, such as a buffer overflow attack. Construct websites that are not vulnerable to client-side attack, such as XSS attacks or SQL injection attacks. Know cryptography techniques such as RSA and MAC. Infer the vulnerabilities in emerging technologies.
Student Outcomes from Criterion 3 covered by this Course
<ul style="list-style-type: none"> Introductory <ul style="list-style-type: none"> None Reinforce <ul style="list-style-type: none"> None Summative <ul style="list-style-type: none"> 1.4, 1.5
List of Topics Covered
<ul style="list-style-type: none"> Security and Privacy concepts Physical Security

- Malware
- Network Security
- Web Security
- OS Security
- Cryptography

Course Number and Name
COSC 4319 Computer Graphics
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Timothy Roden
Textbook, Supplemental Materials
None
Catalog Description
Basic principles for the design, use and understanding of graphics systems. Design and implementation of graphics software packages, applications and algorithms for creating and manipulating graphic displays.
Prerequisites or Co-requisites
Prerequisite: COSC 2336, MATH 2318
Required, Elective or Selected Elective (as per Table 5-1)
Elective
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Demonstrate an understanding of contemporary graphics hardware and software. ○ Create interactive graphics applications in C++ using one or more graphics applications programming interfaces. ○ Write programs that demonstrate 3D geometrical transformations. ○ Understanding the use of object hierarchy in graphics applications. ○ Write program functions to implement visibility detection. ○ Demonstrate authoring and importing of 3D models into a graphics application.
Student Outcomes from Criterion 3 covered by this Course
None
List of Topics Covered
<ul style="list-style-type: none"> • 3D modeling software. • Basic raster graphics algorithms for drawing 2D primitives. • Graphics hardware. • Geometric transformations. • Viewing in 3D. • Object hierarchy. • Interactive input techniques. • Visible-surface determination. • Animation.

Course Number and Name
CPSC 4315 Network Systems Administration
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Frank Sun
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required: <ul style="list-style-type: none"> Nemeth, E., Snyder, G., and Hein, T. R. (2018). Linux Administration Handbook. (5nd edition). Prentice Hall.
Catalog Description
Topics include system security, shell programming, setting up user accounts, system configuration, system startup, management of file systems and disks, and backup and restore operations.
Prerequisites or Co-requisites
Prerequisite: COSC 2336.
Required, Elective or Selected Elective (as per Table 5-1)
Elective
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Installed Linux system server, and setup services. Performed various tasks to maintain network services, protocols, processes in Linux environment. Configured multiples type of application servers, and services.
Student Outcomes from Criterion 3 covered by this Course
None
List of Topics Covered
<ul style="list-style-type: none"> Unix shells Shell commands Processes and threads Services Security Configure servers

Course Number and Name
CPSC 4330 Multimedia Processing
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Jiangjiang Liu
Textbook, Supplemental Materials
<ul style="list-style-type: none"> • Required <ul style="list-style-type: none"> ○ Sayood, K. (2005). Introduction to Data Compression. (3rd edition). Morgan Kaufmann Series. • Supplemental <ul style="list-style-type: none"> ○ Gonzalez, R. C., Woods R. E., and, Eddins S. L. (2004). Digital Image Processing Using MATLAB, Prentice Hall.
Catalog Description
Television style viewing and sound interfacing to computer systems. Software and architectural interconnection requirements of digital interactive video and audio technology, graphical user interface. Definition, examples, application, review of major implementations, and architecture of hypertext systems. Voice technology: synthesis, recognition and response. Student projects.
Prerequisites or Co-requisites
Prerequisite: COSC 2336.
Required, Elective or Selected Elective (as per Table 5-1)
Elective
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> ○ Explain lossless vs. lossy compression and simple lossless encoding. ○ Understand information theory and analyze information content of source data using entropy. ○ Demonstrate an understanding of image compression preliminaries: basis functions and image transforms from an intuitive point of view. ○ Describe various image compression approaches and implement compression techniques. ○ Demonstrate effective use of typical compression techniques for multimedia.
Student Outcomes from Criterion 3 covered by this Course
None
List of Topics Covered
<ul style="list-style-type: none"> • Lossless vs. lossy compression. • Simple lossless encoding: Huffman coding and LZW coding. • Basic information theory. • Lossless coding methods. • Image compression preliminaries. • Properties of color, gray scale, and visual perception. • Wavelet image compression, etc.

Course Number and Name
CPSC 4370 Introduction to Artificial Intelligence
Semester Credit Hours/Contact Hours per week
3/3
Instructor Name
Peggy Doerschuk
Textbook, Supplemental Materials
<ul style="list-style-type: none"> Required <ul style="list-style-type: none"> Russell, S. and Norvig P. (2010). Artificial Intelligence A Modern Approach. (3rd edition). Pearson Education.
Catalog Description
Introduction to concepts and ideas in artificial intelligence. Topics include search techniques, knowledge representation, control strategies and advanced problem-solving architecture.
Prerequisites or Co-requisites
Prerequisite: COSC 2336.
Required, Elective or Selected Elective (as per Table 5-1)
Elective
Outcomes
<p>Students will be able to:</p> <ul style="list-style-type: none"> Demonstrate knowledge and understanding of fundamentals of AI, including intelligent agents, problem solving, searching, game playing, reasoning, planning, learning and robotics. Demonstrate knowledge and understanding of how AI techniques are used in various areas. Apply AI techniques in an area of interest. Write a brief technical report and make a brief technical presentation.
Student Outcomes from Criterion 3 covered by this Course
None
List of Topics Covered
<ul style="list-style-type: none"> Introduction to AI and intelligent agents. Solving problems by searching. Introduction to the KIII. Local search algorithms and optimization problems, online search agents. Adversarial search used in games. Robotics. Learning. Constraint satisfaction problems. Logical agents.

- First-Order logic.
- Inference in First-Order logic.
- Planning.

Appendix B – Faculty Vitae

The following faculty vitae are listed, in order:

- Stefan Andrei
- Peggy Doerschuk
- Hikyoo Koh
- Jiangjiang Liu
- Xingya Liu
- Kami Makki
- Lawrence Osborne
- Timothy Roden
- Bo Sun
- Sujing Wang
- Jing Zhang

Name				
Stefan Andrei, Professor & Department Chair, tenured				
Education				
	Degree	Field	Institution	Date
	Ph.D.	Computer Science	Hamburg University, Germany	2000
	M.S.	Computer Science	“Al. I. Cuza” University of Iasi, Romania	1995
	B.Sc.	Computer Science	“Al. I. Cuza” University of Iasi, Romania	1994
Academic Experience				
<ul style="list-style-type: none"> • Professor & Chair, Lamar University, September 2017 – current • Associate Professor & Chair, Lamar University, January 2013 – August 2017 • Associate Professor, Lamar University, September 2010 – December 2012 • Assistant Professor, Lamar University, June 2007 – August 2010 				
Current Membership in Professional Organizations				
<ul style="list-style-type: none"> • Member of Beta Xi Chapter of Phi Beta Delta Honor Society for International Scholars, since 2014. • Senior Member of the Association for Computing Machinery (ACM), since 2013. • Member of the IEEE (Institute of Electrical Electronic Engineering), since 2004. 				
Honors and Awards				
<ul style="list-style-type: none"> • Senior Member of the Association for Computing Machinery (ACM), 2013. • Singapore-Massachusetts Institute of Technology (MIT) Alliance, CS Program Fellowship, http://web.mit.edu/sma/, July 2002 – July 2005 • Winner of Singapore-MIT Alliance Annual Report Cover Design Competition, March 2004 				
Service Activities				
<ul style="list-style-type: none"> • Editor-in-Chief of the <i>Association of Computer Educators in Texas (ACET) Journal</i>, May 2016-present • Member of the Editorial Board of <i>BRAIN. Broad Research in Artificial Intelligence and Neuroscience</i>, ISSN 2067-3957 (online), ISSN 2068 - 0473 (print), May 2012-present • Member of the Program Committee of the <i>International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC 2019, 2018, 2017, 2016, 2015)</i> IEEE Computer Society. • Member of the Program Committee of the <i>IEEE International Conference on Pervasive Intelligence and Computing (PICOM 2019, 2018, 2017, 2016, 2015)</i>. • Member of the Technical Program Committee (TPC) of the <i>International Conference on Systems and Informatics (ICSAI 2019, 2018, 2017, 2016, 2015)</i>. • Member of the Program Committee of the <i>International Conference on Informatics in Control, Automation and Robotics (ICINCO 2017, 2014, 2013)</i>. • Member of the Program Committee of the <i>First ESWeek Workshop on Declarative Embedded and Cyber-Physical Systems (DECPS 2017)</i>, October 19, 2017, Seoul, South Korea. • Conference Chair of the <i>52nd Association of Computer Educators in Texas Conference (ACET 2016)</i>. 				
Recent Publications				
<ul style="list-style-type: none"> • Stefan Andrei, Albert M. K. Cheng, Vlad Radulescu. Processor Bounding for an Efficient Non-preemptive Task Scheduling Algorithm, <i>Mathematics in Computer Science</i>, Springer Verlag, 				

2019

- Stefan Andrei, Vlad Radulescu, Albert Cheng. Logic and Programming Efficient Task Switching-based Multiprocessor Scheduling for Non-preemptive Independent Task Sets, *Proceedings of 19th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC'18)*, 2018.
- Vlad Rădulescu, Ștefan Andrei, Albert M. K. Cheng. Bounding execution resources for the task scheduling problem in cyber-physical systems, *ACM SIGBED Review*, Volume 15 Issue 4, Pages 20-28, 2018.
- Kishor Datta Gupta, Manjurul Ahsan, Stefan Andrei. Extending the Storage Capacity and Noise Reduction of a Faster QR-Code, *Broad Research in Artificial Intelligence and Neuroscience (BRAIN)*, Vol 9, No 1, pages 59-71, 2018.
- Kishor Datta Gupta, Manjurul Ahsan, Stefan Andrei, Kazi Md. Rokibul Alam - A Robust Approach of Facial Orientation Recognition from Facial Features, in Vol 8, No 3, pp. 5-12, journal *BRAIN – Broad Research in Artificial Intelligence and Neuroscience*, 2017.
- Vraj Pandya, Stefan Andrei - *About the Design of QUIC Firefox Transport Protocol*, in journal *BRAIN – Broad Research in Artificial Intelligence and Neuroscience*, Vol 8, No 2, pp. 26-32, 2017.
- Stefan Andrei, Arnob Saha, and Sojibur Rahman: Two New Software Behavioral Design Patterns: Obligation Link and History Reminder. *BRAIN - Broad Research in Artificial Intelligence and Neuroscience*, Edusoft Publishing, Vol. 7, No. 2, pp. 78-90, 2016.
- Stefan Andrei, Milin Joshi, Chandrakant Rudani, Ankur Shah, and Bharatkumar Tejawani: Modeling, Designing, and Implementing an Avatar-based Interactive Map. *BRAIN - Broad Research in Artificial Intelligence and Neuroscience*, Edusoft Publishing, Vol. 7, No. 1, pp. 50-60, 2016.
- Vlad Radulescu, Stefan Andrei, Albert Cheng: Effective Bounding for the Number of Processors of a Task Scheduling Problem. *Proceedings of 19th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC'17)*, IEEE Computer Society, Timisoara, Romania, 2017.
- Vlad Radulescu, Stefan Andrei and Albert M. K. Cheng - Bounding Execution Resources for the Task Scheduling Problem in Cyber-Physical Systems, *The First ESWeek Workshop on Declarative Embedded and Cyber-Physical Systems (DECPS 2017)*, Seoul, South Korea, 2017.

Recent Professional Development Activities

- Stefan Andrei, Greg Yera, Timothy Gonzales: Double-lock screw thread container and pipe connector. *Lamar University Invention Disclosure Form*, Beaumont, TX, USA, July 1, 2016.
- PI of the Texas Workforce Commission Grant “*Camp Code for Girls*”, (\$89,753 USD), 2018-2019.
- co-PI of the Lamar University Visionary Initiative Grant “*A Center for Applications of Digital Technologies in Health and Disability*”, \$300,000 USD, 2016 – 2019.
- Senior Personnel of the National Science Foundation Grant called “*Data Driven Network Infrastructure Upgrade for Lamar University Research*”, Award No. CC*-DNI 1541242, \$494,291 USD, 2016 – 2019.
- co-PI of the National Science Foundation Grant “*Addressing the Gulf Coast Region's Graduation Rate Crisis in Mathematics and Computer Science*”, Award No. DUE-1154606, \$583,096 USD, 2012 – 2018.

Name					
Peggy Doerschuk, University Professor, tenured					
Education					
	Degree	Field	Institution	Date	
	Ph.D.	Computer Science	Tulane University, New Orleans, Louisiana	1990	
	B.S.	Mathematics	University of Southwestern Louisiana, Lafayette, Louisiana	1970	
Academic Experience					
<ul style="list-style-type: none"> University Professor, Department of Computer Science, Lamar University, 2011–present. Professor, Department of Computer Science, Lamar University, 2004-2011. Associate Professor, Department of Computer Science, Lamar University, 1997-2004. Assistant Professor, Department of Computer Science, Lamar University, 1993-1997. Assistant Professor, Computer Science Department, University of Alabama, 1990-1993. Teaching Assistant, Tulane University, 1984-1987. 					
Non-academic Experience					
<ul style="list-style-type: none"> Neural Network Consultant, Ochsner Health Plan, New Orleans, 1993-1995. 					
Honors and Awards					
<ul style="list-style-type: none"> PI/Co-PI on over \$2 million in grants from NSF, TX, NASA, Army, ExxonMobil, CREU, LU 1995-2016. <p>Founding Director of STAIRSTEP, a NSF supported program for recruiting, retaining and transitioning underrepresented, low income, first generation undergraduates in STEM. This provided support for teams in Computer Science, Math, Biology, Chemistry, Geology and Physics - 2009 – 2016.</p> <ul style="list-style-type: none"> Selected as LU nominee for a Regents' Professor Award 2014. Member of the Executive Committee of the Faculty Senate – 2001-2006, 2013-2014. Texas Higher Education Coordinating Board Star Award for Closing the Gaps in Texas Higher Education awarded to the STAIRSTEP program that I founded and directed, 2013. Lamar University Professor - an honor awarded for life; the university's most prestigious faculty award 2011. Andrew Green College of Engineering Performance Award for outstanding performance in research and teaching, Lamar University 2000. University Merit Award for distinguished teaching, Lamar University 1997. Founding Director of INSPIRED, a NSF supported program for increasing participation of women and underrepresented minorities in computing. – 2007 – 2011. Founding Director of WIRED, a program to increase participation of women in computing, supported by a Texas Workforce Development grant and grants from ExxonMobil – 2002-2008. President of the Faculty Senate – 2003-2004. Vice President of the Faculty Senate – 2001-2003. Secretary of the Faculty Senate – 2001-2002. 					
Service Activities					

- Mentor to junior faculty – 2014–present.
- Member of the University Graduate Faculty Review Committee – 2018-present.
- Member of the Arts and Sciences Council, 2016.
- Member of Advisory Committee of Office of Undergraduate Research, 2016.
- Member of CS Department Curriculum Committee, Retention Committee, 2015-2016.
- Directed STAIRSTEP outreach activities that included hosting campus visits by 90 high school students, participating in mini-CAST Science Conference for the Advancement of Science Teaching, visits to Lamar State College Orange and Lee College; and participation in ExxonMobil Barnard Harris Summer Camp for 46 6th, 7th, and 8th graders, 2014-2016.
- Chair of Faculty Senate Ad Hoc Committee on Retention, 2014.

Recent Publications

- “Broadening Participation in Undergraduate Research, presented at the 2017 Conference of the Association for Computing Educators in Texas, San Antonio, October, 2017.
- Introducing Deep Learning in an Introductory Artificial Intelligence Class, presented at the 2017 Conference of the Association for Computing Educators in Texas, San Antonio, October, 2017.
- Closing the Gaps and Filling the STEM Pipeline: A Multidisciplinary Approach”, P. Doerschuk, C. Bahrim, J. Daniel, J. Kruger, J. Mann, C. Martin, *Journal of Science Education and Technology*, 2016, DOI 10.1007/s10956-016-9622-8.
- “Recruiting, retaining and transitioning computing undergraduates the STAIRSTEP way,” Peggy Doerschuk and Judith Mann, Proceedings of the 45th ASEE/IEEE Frontiers in Education Conference, October, 2015.
- “An Award Winning Program for Increasing Participation in STEM,” P. Doerschuk, C. Bahrim, J. Daniel, J. Kruger, J. Mann, C. Martin, Proceedings of the 44th ASEE/IEEE Frontiers in Education Conference, October, 2014.
- “The transformation of a low producing program into a very dynamic and successful Physics program,” Cristian Bahrim and Peggy Doerschuk, *Bulletin of the American Physical Society* 59 (2014).

Recent Professional Development Activities

- Developed online course in Fundamentals III COSC 2336 using Pearson’s Revel interactive learning system – 2018.
- Developed Deep Learning and Applications learning module for Machine Learning CPSC 4375/5375 courses - 2018.
- Developed instructional materials for Intro to AI courses CPSC 4370/5370 - 2017.
- Faculty Development Leave to study Deep Machine Learning - 2016-2017.
- Secured funding for STAIRSTEP from the LU Provost to support STAIRSTEP for 2016-2017 \$98k, and 2017-2018 \$50k.
- STAIRSTEP undergraduates made a total of 42 research presentations/publications in 2014-2016.

Name					
Hikyoo Koh, Professor, tenured					
Education					
	Degree	Field	Institution	Date	
	Ph.D.	Computer Science	University of Pittsburgh	1978	
	M.S.	Computer Science	University of Hawaii	1971	
	B.A.	Law	YungNam University	1964	
Academic Experience					
<ul style="list-style-type: none"> • Professor, Department of Computer Science, Lamar University, 1991-present. • Associate Professor, Department of Computer Science, Lamar University, 1985-1991. • Assistant Professor, Department of Computer Science, Lamar University, 1981-1985. • Assistant Professor, Computer Science Department, Wichita State University, 1978-1981. • Teaching Fellow, Computer Science Department, University of Pittsburgh, 1973-1978. 					
Non-academic Experience					
<ul style="list-style-type: none"> • Programmer, Population Institute, Honolulu, Hawaii, 1971-1973. • Lt. Colonel (retired), Korean Air Force, 1953-1973. 					
Current Membership in Professional Organizations					
<ul style="list-style-type: none"> • Life Member, IEEE 					
Honors and Awards					
<ul style="list-style-type: none"> • Outstanding Service Award, Advisory Council on Democratic and Peaceful Unification of Korea, September 2005. 					
Service Activities					
<ul style="list-style-type: none"> • Supervised 23 Project/Thesis while at Lamar. • Faculty Advisor for Lamar UPE Student Chapter, 2005-2009. • Reviewer for “Crafting a Compiler” 2nd Edition, by Fisher, Cytron and LeBlanc., published by Addison-Wesley Publishing, January 2009. • Faculty Evaluator included in a research proposal “Lab-based Learning of Multi-Core Parallel Programs for the Design and Analysis of Algorithms” submitted to NSF by Quoc-Nam Tran, CS Department, Lamar University, August 2009. 					
Recent Publications					
<ul style="list-style-type: none"> • Hikyoo Koh, “An Integrated Approach to Computer Ethics Education”, An abstract, IEEE International Symposium on Ethics, Chicago, Illinois, 2014. • Hikyoo Koh, “A case Study Approach to Computer Ethics Education,” International Conference on Computer and Information Sciences, Honolulu, Hawaii, 2016. 					
Recent Professional Development Activities					
<ul style="list-style-type: none"> • None for last 5 years. On medical leave for 6 semesters since Spring 2015. 					

Name				
Jiangjiang Liu, Professor, tenured				
Education				
	Degree	Field	Institution	Date
	Ph.D.	Computer Science and Engineering	University at Buffalo, The State University of New York	2004
	M.S.	Computer Science and Engineering	University at Buffalo, The State University of New York	2003
	B.E.	Computer Engineering	Beijing University of Posts And Telecommunications, China	1997
Academic Experience				
<ul style="list-style-type: none"> • Professor, Department of Computer Science, Lamar University, 2016-present. • Associate Professor, Department of Computer Science, Lamar University, 2009-2016. • Assistant Professor, Department of Computer Science, Lamar University, 2004-2009. 				
Non-academic Experience (N/A)				
Current Membership in Professional Organizations				
<ul style="list-style-type: none"> • Association for Computing Machinery (ACM). • Women in Engineering (WIE) • The Institute of Electrical and Electronics Engineers (IEEE) 				
Honors and Awards				
<ul style="list-style-type: none"> • Lamar University – University Professor Award, spring 2017. 				
Service Activities				
<ul style="list-style-type: none"> • Advisory Board Member: Advisory Board for the International Conference on Computing Advancements (ICCA 2019). • Referee: IEEE Transactions on Education (2015, 2017), ACM Transactions on Education (2017), International Journal IET Computers & Digital Techniques, Nov. 2006, and International Journal Microprocessors and Microsystems (MICPRO 2006, 2008). • Reviewer: IEEE Transactions on Education (TE 2017), IEEE International Symposium on Circuits and Systems (ISCAS 2015), ACM Technical Symposium on Computer Science Education (SIGCSE 2015) 				
Publication				
(Liu's advisees indicated by: undergraduates[†] and graduate students[‡])				
<ul style="list-style-type: none"> • Fei Gao[‡], Chandrima Bhowmick[‡] and Jiangjiang Liu, "Performance Analysis Using A-priori Algorithm Along with Spark and Python," the 1st International Conference on Computing and Big Data (ICCBD 2018), Charleston, SC, Sept. 8 – 10, 2018. • Fei Gao[‡], Ananya Dutta[‡], Jiangjiang Liu, "Content-Based Textual Big Data Analysis and Compression," the 1st International Conference on Computing and Big Data (ICCBD 2018), Charleston, SC, Sept. 8 – 10, 2018. • Sujan Kumar[‡] and Jiangjiang Liu, "Byte-based Partial-Match Instruction and Data 				

Compression for High-Performance and Low-Power Interconnects,” 4th IEEE International New Circuits and Systems Conference (NEWCAS), pp. 1-4, Vancouver, Canada, June 26-29, 2016.

- Bulbul Ahmed[‡], Sujan Kumar[‡], and Jiangjiang Liu, “Modified Bus Invert Encoding to Reduce Capacitive Crosstalk Power and Inductive Noise,” 2nd IEEE International Conference on Electrical Information and Communication Technology (EICT 2015), pp. 95-100, KUET, Khulna, Bangladesh, Dec. 20-12, 2015.
- Sujan Kumar[‡], Bulbul Ahmed[‡], and Jiangjiang Liu, “A Survey on Interconnect Encoding for Reducing Power Consumption, Delay and Crosstalk,” 2nd IEEE International Conference on Electrical Information and Communication Technology (EICT 2015), pp. 7-12, KUET, Khulna, Bangladesh, Dec. 20-12, 2015.
- Harshil Parikh[‡] and Jiangjiang Liu, “A Survey on Big Data Analysis and Challenges,” 8th Annual International Conference of Education, Research and Innovation (ICERI 2015), Seville, Spain, Nov. 16-19, 2015.
- Jiangjiang Liu, Cheng-Hsien Lin, Joshua Wilson[†], David Hemmenway[†], and Yingbo Xu[‡], “Oh SNAP! A One-Week Summer Computing Workshop for K-12 Teachers,” 10th IEEE International Conference on Computer Science & Education (ICCSE 2015), pp. 663-668, Fitzwilliam College, Cambridge University, UK, July 22-24, 2015.
- Jiangjiang Liu, Cheng-Hsien Lin, Joshua Wilson[†], David Hemmenway[†], Ethan Hasson[†], Zebulun Barnett[†], and Yingbo Xu[‡], “Making Games a "Snap" with Stencyl – A Summer Computing Workshop for K-12 Teachers,” 45th ACM Technical Symposium on Computer science education (SIGCSE 2014), pp. 169-174, Atlanta, FL, March 5-8, 2014.
- Jiangjiang Liu, Cheng-Hsien Lin, Phillip Potter[‡], Ethan P. Hasson[†], Zebulun D. Barnett[†], and Michael Singleton[†], “Going Mobile with App Inventor for Android: A One-Week Computing Workshop for K-12 Teachers,” Proc. 44th ACM Technical Symposium on Computer Science Education (SIGCSE 2013). pp. 433-438, ACM, Denver, CO, Mar. 6-9, 2013.
- Peggy Doerschuk, Valerie Juarez[†], Jiangjiang Liu, Daniel Vincent[†], Kathlyn Doss[†], and Judith Mann, “Introducing Programming Concepts through Video Game Creation,” Proc. 43rd Annual IEEE Frontiers in Education Conference (FIE 2013), pp. 523-529, Oklahoma, OK, Oct. 23-26, 2013.

Recent Professional Development Activities

“First Year Success,” Texas State University System (TSUS) Faculty Fellowship, 2017.

“NSF CAREER - An Effective Integration of Research and Education on High-Speed and Energy-Efficient Interconnects for Multi-Core and Multi-Thread Systems,” \$400,000 National Science Foundation (NSF), Sept. 2009 – Aug. 2015.

CRA-W Mid-Career Mentoring Workshop Travel Grant, \$1000, 2015.

CAR-W Mid-Career Mentoring Workshop, 2016

CRA-W Mid-Career Mentoring Workshop, 2015.

ABET Fundamentals of Program Assessment Workshop, 2014

Name				
Xingya Liu, Assistant Professor, tenure-track				
Education				
Degree	Field	Institution	Date	
Ph.D.	Electrical and Computer Engineering	UNC Charlotte	2017	
M.S.	Electrical and Computer Engineering	Pennsylvania State University	2012	
B.S.	Electrical and Computer Engineering	Shanghai Jiao Tong University	2010	
Academic Experience				
<ul style="list-style-type: none">Assistant Professor, Department of Computer Science, Lamar University, 2017-Present.Graduate Research Assistant, Electrical and Computer Engineering Department, University of North Carolina at Charlotte, 2013-2017.				
Non-academic Experience (N/A)				
Current Membership in Professional Organizations				
<ul style="list-style-type: none">Association for Computing Machinery (ACM)The Institute of Electrical and Electronics Engineers (IEEE)				
Honors and Awards				
<ul style="list-style-type: none">Distinguished Member of INFOCOM 2019 TPC				
Service Activities				
<ul style="list-style-type: none">Faculty Mentor and Coach, Association for Computing Machinery (ACM) Student Chapter, Lamar University, 2018-present.Program Director, Cybersecurity B.S. Degree at Lamar, 2017-present.Technical Program Committee Member: IEEE INFOCOM (2018, 2019), IEEE Edge Computing (2018,2019), IEEE ICCAIS 2019, IEEE GCC 2019Reviewer: IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Transactions on Wireless Communications, IEEE Transactions on Vehicular Technology, IEEE Transactions on Cloud Computing, IEEE Wireless Communications Letters, IEEE Communications Letters, IEEE Internet of Things Journal, IEEE Access, IEEE Transactions on Cognitive Communications and Networking, Computer Networks Journal (Elsevier), Ad Hoc Networks Journal (Elsevier), CCF Transactions on Networking, Wireless Networks (Springer), International Journal of Ad Hoc and Ubiquitous Computing (InderScience), International Journal of Distributed Sensor Networks (SAGE)				
Recent Publications				
<ul style="list-style-type: none">Xingya Liu, “<i>Blind Rendezvous: A Promising Candidate of Secure Spectrum Access for D2D commu- nications in IoT,</i>” Proceedings of International Workshop on Attacks and Defenses for Internet-of- Things (ADIoT) at IEEE Conference on Communications and Network Security (CNS), Beijing, China, 2018.Haoxin Wang, Jiang Xie, and Xingya Liu, “<i>Rethinking Mobile Devices’ Energy Efficiency in WLAN Management Services,</i>” Proceedings of IEEE International Conference on Sensing, Communication and Networking (SECON), Hong Kong, China, 2018.Tamer Samak, Jiang Xie, and Xingya Liu, “<i>Multi-destination Rendezvous in Cognitive Radio Net- works,</i>” Proceedings of IEEE International Conference on Communications (ICC), Kansas City, KS, 2018.Xingya Liu, and Jiang Xie, “<i>Priority-based Spectrum Access in Cognitive D2D</i>				

<p><i>Networks for Inter- net of Things,”</i> Proceedings of IEEE International Conference on Communications (ICC), Paris, France, 2017.</p> <ul style="list-style-type: none"> • Xingya Liu, and Jiang Xie, “<i>2D Heterogeneous Spectrum Access for Multi-wideband Cognitive Radio Networks,”</i> Proceedings of IEEE International Conference on Computer Communications (INFOCOM), Atlanta Georgia, 2017. • Xingya Liu, and Jiang Xie, “<i>A Self-Adaptive Optimal Fragmentation Protocol for Multi-channel Cog- nitive Radio Ad Hoc Networks,”</i> Proceedings of IEEE Global Telecommunications Conference (GLOBE- COM), Washington D.C., 2016. • Xingya Liu, and Jiang Xie, “<i>Contention Window-based Deadlock-free MAC for Blind Rendezvous in Cognitive Radio Ad Hoc Networks,”</i> Proceedings of IEEE Global Telecommunications Conference (GLOBECOM), San Diego, California, 2015. • Xingya Liu, and Jiang Xie, “<i>SUBSET: A Joint Design of Channel Selection and Channel Hopping for Fast Blind Rendezvous in Cognitive Radio Ad Hoc Networks,”</i> Proceedings of IEEE International Conference on Sensing, Communication and Networking (SECON), pp. 426-434, Seattle, Washington, 2015. • Xingya Liu, and Jiang Xie, “<i>A Slot-asynchronous MAC Protocol Design for Blind Rendezvous in Cog- nitive Radio Networks,”</i> Proceedings of IEEE Global Telecommunications Conference (GLOBECOM), pp. 4641-4646, Austin, Texas, 2014. • Xingya Liu, and Jiang Xie, “<i>A Practical Self-adaptive Rendezvous Protocol in Cognitive Radio Ad Hoc Networks,”</i> Proceedings of IEEE International Conference on Computer Communications (INFOCOM), pp. 2085-2093, Toronto, Canada, 2014.
<p>Recent Professional Development Activities</p> <p>ABET Program Assessment Workshop, Dallas, Texas, April 2019.</p> <p>“Creating IoT Solutions to Promote Quality Healthcare for Older Adults Residing in Rural Communities in Southeast and East Texas”, CICE Innovation Grants, Co-PI, Lamar University, June 2019, \$4,000.</p> <p>“Secure Spectrum Access for Device to Device Communications in the Internet of Things,” Research & Creative Activity Research Enhancement Grant, Lamar University, March 2018, \$5,000.</p>

Name				
Kami Makki, Professor, tenure-track				
Education				
	Degree	Field	Institution	Date
	Ph.D.	Computer Science	University of Queensland	1997
	M.S.	Computer Science	University of New South Wales	1991
	MSc	Civil Engineering	University of Tehran	1980
	BEng	Civil Engineering	University of Tehran	1978
Academic Experience				
<ul style="list-style-type: none"> • Professor, Department of Computer Science, Lamar University, 2015-present. • Associate Professor, Department of Computer Science, Lamar University, 2008-2015. • Assistant Professor, Department of Electrical Engineering & Computer Science, The University of Toledo, 2003- 2008. • Assistant Professor (Lecturer), Department of Software Engineering & Data Communications, Queensland University of Technology, 2000-2003. • Assistant Professor (Lecturer), Department of Computer Science, Royal Melbourne Institute of Technology, 1998-2000. • Teaching Assistant, Department of Computer Science, University of Queensland, 1994-1995. 				
Non-academic Experience				
<ul style="list-style-type: none"> • Software Engineer, Centre for Information Technology (CITEC), 1995-1997. • Software Engineer, Daihatsu, Pty, Ltd., 1991-1992. 				
Honors and Awards				
<ul style="list-style-type: none"> • Plaque Award for Outstanding Service from 53rd IEEE International Conference IEEE Global Communications Conference, Exhibition & Industry Form (GlobeCom'10), In Recognition of Outstanding Contributions to IEEE GLOBECOM 2010. 				
Service Activities				
<ul style="list-style-type: none"> • Conference Chair, IEEE Technically Co-Sponsored Science and Information Conference, 6-7 London, United Kingdom, September 2018. • Organizing Committee member, 7th World Congress on Healthcare and Technologies, London, United Kingdom, 26-27 September 2016. • Committee member, 4th International Symposium on Security in Computing and communications (SSCC'16), Jaipur, India, September 21-24, 2016. • Editorial Board Member for International Journal of Computer Science Applications & Information Technology, Publisher- Academy Research and Publication Center. AR Publication. • The College of Arts & Sciences Mirabeau Scholarship Selection Committee, Committee Chair, Fall 2014-2016. • Lamar University Faculty Senate, Committee Chair Academic Issues Committee, Senator At-large College of Arts & Sciences, Fall 2014- Fall 2015. • Lamar University Faculty Senate, Vice Chair Academic Issues, Senator At-large College of Arts & Sciences, Fall 2015-Fall 2017. • The University Faculty Senate, member of Executive Committee, Fall 2014-Fall 2018. • Lamar University Faculty Senate, Chair of Senate Nominations Committee, Fall 2016- Fall 				

2017

- Presenting Department of Computer Science at NoMagic Conference, Allen, Texas, May 2017.
- Director of Department Computer Science Upsilon Pi Epsilon Society (Honor Society for the Computing Science & Information Disciplines), Fall 2009-present.
- Associate Editor for International Journal of Sensors, Wireless Communications and Control (SWCC), Bentham Science Publisher, August 2015-present.
- Associate Editor, The International Journal of Privacy and Health Information Management (IJPHIM), IGI, Publisher.
- Editorial board member of the Journal of Information Assurance and Cybersecurity, JIACS, IBIMA Publishing.
- Associate Editor-in-Chief of the International Journal of Research and Reviews in Wireless Sensor Networks (IJRRWSN), Science Academy Publisher United Kingdom.
- Vice Conference-Chair, IEEE Technically Co-Sponsored Science and Information Conference, 18-20 July, 2017, London, UK.
- Panel Member for Centers of Research Excellence in Science and Technology (CREST) and HBCU Research Infrastructure for Science and Engineering (RISE) for the Division of Human Resource Development, National Science Foundation, Arlington, Virginia, U.S.A.
- Panel Member for the Division of Computer and Communication Foundations, National Science Foundation, Arlington, Virginia, U.S.A.

Recent Publications

- S. Kami Makki, and M. Rakibul Hasan, Measuring the Performance of Data Placement Structures for MapReduce-based Data Warehousing Systems, International Journal of New Computer Architectures and Their Applications (IJNCAA), Vol. 8, No. 1, March, 2018.
- Sourangshu Das and S. Kami Makki, Sentiment analysis of social media data utilizing mining classifiers, The 14th International Conference on Data Science, Las Vegas, July 30-August 2, 2018.
- Mohammad R. Hasan and S. Kami Makki, Performance Evaluation of Data Placement Structures for Hive Data Warehouses, The 3rd International Conference on Data Mining, Internet Computing, and Big Data (BigData2016), Konya, Turkey, July 21-23, 2016.
- Izadpanah Saman and Makki S. K., An enhanced users' similarity computation utilizing one-class collaborative filtering, International Journal of Big Data Intelligence (IJBDI), Vol. 3, Issue 4, pp. 250-256, Inderscience publishers, ISSN: 2053-1389, Online ISSN: 2053-1397, September 2016.

Recent Professional Development Activities

Participated in a Seminar on “You Can't Build on Broken: A New Framework for Community Change” by Angela Blanchard, Landes Auditorium, Galloway Business Building, March 2nd, 2017.

Nominated for the 2018 NCWIT Undergraduate Research Mentoring Award, 2018.

Office of Undergraduate Research, Lamar University – (Undergraduate Students Advisor), \$1500, supports undergraduate student Mr. John Ellis, November 2016.

Development of Innovative Concepts of Resilience of Interdependent Critical Infrastructure under Repeated Climatological and Malicious Threat - An Industry/ University partnership, Lamar University, \$300,000 (Co-PI), (PI: David Cocke), February 2016.

Name					
Lawrence J. Osborne, Professor, tenured					
Education					
	Degree	Field	Institution	Date	
	Ph.D.	Computer Science	University of Missouri at Rolla	1989	
	M.S.	Computer Science	University of Missouri at Rolla	1985	
	M.S.	Mathematics	University of Missouri at Missouri	1981	
	B.S.	Mathematics Education	Southeast Missouri State University at Cape Girardeau	1968	
Academic Experience					
<ul style="list-style-type: none"> • Professor, Computer Science Department, Lamar University, 9/2000 - Present. • 11/95 - 01/2013: Chair of Computer Science • 8/93 - 11/95: Interim Chair of Computer Science, Lamar University • 8/94 - 8/2000: Associate Professor of Computer Science, Lamar University • 8/90 - 8/94: Associate Professor of Computer Science, Lamar University • 8/89 – 6/90: Assistant Professor of Computer Science, Southwest Missouri State University, Springfield, Missouri. 					
Non-academic Experience					
<ul style="list-style-type: none"> • IBM consultant in Houston on Fault Tolerant TestBed on Space Station project 1992. 					
Current Membership in Professional Organizations					
<ul style="list-style-type: none"> • Association for Computing Machinery (ACM). • CSAB, Inc. • Institute of Electrical and Electronics Engineers (IEEE). 					
Honors and Awards					
<ul style="list-style-type: none"> • Nominated for 2018 David J. Beck Teaching Excellence Award at Lamar University. 					
Service Activities					
<ul style="list-style-type: none"> • Member of University Undergraduate Curriculum Committee beginning Fall 2018. • Chair of University Academic Technology Committee 2013-present. • Member of University IT Steering Committee 2013-fall 2019. • Chair of Dept. Curriculum Committee from 2013 to present. • Member of Dept. Assessment Committee • ABET Program Evaluator • Member of Program Committee and Reviewer for SIGCSE 2019 • Member of Program Committee and Reviewer for SIGCSE 2018 • Reviewer for South Central Conference of the Consortium for Computing Sciences in Colleges (CCSE:SC) Colleges meeting April 6, 2018. • Reviewer for ITICSE2014. • Coordinator for Spring Advisory Board Meetings 2013-2017. 					
Recent Publications					

- Osborne, Lawrence, "Bitcoin and the Byzantine Generals Problem", Proceedings of Association for Computer Educators in Texas (ACET), October 28-29, 2016, Lamar University, Beaumont, Texas.
- Das, K. P., & Daniel, B. D., & Andrei, S., & Osborne, L. J. (2016, June 28), *ASCENT - A Program Designed to Support STEM Students through Undergraduate Research and Mentoring*. Paper presented at 2016 ASEE Annual Conference & Exposition, New Orleans, Louisiana. 10.18260/p.26282.
- Osborne, Lawrence, "A Cybersecurity Curriculum for Secure Software Code Development for Software Engineering." Proceedings of Association for Computer Educators in Texas (ACET), October 17-18, 2014, San Antonio College, San Antonio, Texas.
- Osborne, Lawrence, "A Comparison of Two Ways of Teaching Discrete Structures to Undergraduate Computer Science Students." Proceedings of Association for Computer Educators in Texas (ACET), October 11-12, 2013, Baylor University, Waco, Texas.
- Andrei, Stefan, Osborne, Lawrence, and Smith, Zanthia, "Designing an American Sign Language Avatar for Learning Computer Science Concepts for Deaf or Hard-of-Hearing Students and Deaf Interpreters". Journal of Educational Multimedia and Hypermedia, 2013, volume 22, number 3, pp. 287-300.

Recent Professional Development Activities

Das Kumer PI, Andrei, Stefan, CO-PI, Daniel, Dale, CO-PI, and Osborne, Lawrence CO-PI, "Addressing the Gulf Coast Region's Graduation Rate Crisis in Mathematics and Computer Science (ASCENT)" NSF. \$546,897.00 over 5-year proposal. This grant has matching commitments from Lamar Research Office of \$61,680, Dean Nichols for \$30,000, and Provost Doblin \$22,500. Grant is from June 1, 2012 to May 31, 2017.

Parsons, Priscilla PI, Kelleher, Peter CO-PI, Stewart, Patrick, CO-PI, and Osborne, Lawrence J. CO-PI, "CC*DNI Networking Infrastructure: Data Driven Network Infrastructure Upgrade for Lamar University Research" NSF, \$376,917, awarded on February 19, 2016. The Award Number is 1541242.

Makki, Kami P.I., and Osborne, Lawrence J., CO-PI. "Engagement of Undergraduates in Security of Applications of Large Data using Mobile Devices", submitted NSF REU proposal National Science Foundation (NSF) - \$282,023.00 over three years. Submitted on August 24, 2014, but not funded.

- Attended 2017 Provost's KickOff, Thursday, August 24, 7:30 a.m. to 5:30 p.m. Mary and John Gray Library—8th floor. Hands-on workshops about universal course design, guidance on finding grant opportunities and research collaborators, supporting a diverse student body, and other matters.
- Attended workshop entitled "Advanced Program Assessment" given by ABET employees at the 2018 ABET Symposium from April 11-14 in San Diego. Attended the ABET Symposium in San Diego on April 11-14, 2018 including the "Advanced Program Assessment Workshop on April 14. This event included an update on the progress made in the development of the Cybersecurity criteria.
- Attended "Provost Kickoff" on August 23, 2018 in Setzer Center. Workshops included the following topics:
 - a. Library Resources by Michael Saar including a faculty toolkit,
 - b. Library Instruction embedded in Blackboard,

Name				
Timothy E. Roden, Associate Professor, tenured				
Education				
	Degree	Field	Institution	Date
	Ph.D.	Computer Science	University of North Texas	2005
	M.S.	Computer Science	University of Texas at Arlington	1995
	B.S.	Computer Science	Angelo State University	1989
	B.A.	English	Midwestern State University	1986
Academic Experience				
<ul style="list-style-type: none"> • Associate Professor, Department of Computer Science, Lamar University, 2013-present. • Assistant Professor, Department of Computer Science, Lamar University, 2012-2013. • Associate Professor and Department Head, Computer Science Department, Angelo State University, 2007-2012. • Assistant Professor, Computer Science Department, University of Louisiana at Lafayette, 2005-2007. • Lecturer, Computer Science Department, University of North Texas, 2001-2005. • Graduate Teaching Assistant, Computer Science Department, University of Texas at Arlington, Fall 1991. • Assistant Instructor, Computer Science Department, Angelo State University, Spring 1990. 				
Non-academic Experience				
<ul style="list-style-type: none"> • Software Engineer, Idaho National Engineering Laboratory, 1997-2000. • Senior Software Engineer, Evans & Sutherland, 1991-1997. 				
Current Membership in Professional Organizations				
<ul style="list-style-type: none"> • Association for Computing Machinery (ACM). 				
Honors and Awards				
<ul style="list-style-type: none"> • Nominated for 2018 David J. Beck Teaching Excellence Award at Lamar University. • Nominated for ASU Rammy “Professor of the Year”, College of Sciences, April 2010. • National Science Foundation Scholarship (2002-2003, renewed for 2003-04). • University of North Texas Faculty Scholarship (2002-03, 2003-04, 2004-05). 				
Service Activities				
<ul style="list-style-type: none"> • ABET Program Assessment Workshop, Dallas, Texas, April 2019. • Department ABET and SACS undergraduate coordinator, 2012-present. • Chair, Department of Computer Science Assessment Committee, 2012-present. • Chair, College of Arts & Sciences Curriculum Committee, 2017-present. • Review Board, Journal of Computer Science Applications and Information Technology, The Symbiosis Group, 2017-present. • Reviewer, Entertainment Computing (Journal), 2016-present. • Reviewer, course for high school students interested in STEM, Stephen F. Austin University, July 2016. • Reviewer, Office of Undergraduate Research Grant Awards, Lamar University, October 2016. • Co-webmaster, Department of Computer Science website, 2012-present 				

- Reviewer, Office of Undergraduate Research Grant Awards, Lamar University, October 2015.
- Faculty Sponsor, Association for Computing Machinery (ACM) Student Chapter, Lamar University, 2013-2015.
- Associate Editor, Journal of Graphics Tools, June 2012-2015.

Recent Publications

- T. Roden. "Positive Experiences with an Online Introductory Course in Computer Game Development", *Proceedings of the 8th International Conference on Computer Science Education: Innovation and Technology*, Singapore, October 9-10, 2017.
- T. Roden. "Benefits of an Introductory Course in Computer Game Development", *Proceedings of the IEEE 9th International Conference on Computer Science & Education*, Vancouver, Canada, pp. 316-321, August 22-24, 2014.
- T. Roden, R. LeGrand, R. Fernandez, J. Brown, J. Deaton, and J. Ross Jr., "Development of a Smart Insole Tracking System for Physical Therapy and Athletics", *Proceedings of the 7th International Conference on Pervasive Technologies Related to Assistive Environments*, Rhodes Island, Greece, Article No. 40, May 27-30, 2014.
- T. Roden and R. LeGrand, "Experiences Teaching a Course in Android Game Development", *Proceedings of the 9th International Conference on the Foundations of Digital Games*, Ft. Lauderdale, FL, April 3-7, 2014.

Recent Professional Development Activities

"System, Method and Apparatus for Securely Saving/Retrieving Data on a Data Storage Device", U.S. Patent Application D-0582, September 14, 2012.

Accreditation Board for Engineering and Technology (ABET) Program Assessment Workshop, Milwaukee, Wisconsin, September 2012.

"Netsafe Cloud Technology Project", Grant from ASU Information Technology Department, June 2012, \$7,154.

"MedHab Technology Project", Private Grant from Fort-Worth-based MedHab, LLC., September 2011, \$108,394.

"Development of Online Course in Android Programming", Research Grant, USAA (Financial Services Company), June 2011, \$5,000.

Game Developer's Conference, San Francisco, California, March 2011.

"Development of University Infrastructure and Curriculum for a Course in iPhone Programming", Faculty Development and Enrichment Fund Grant, Angelo State University, March 2010, \$2,000.

Game Developer's Conference, San Francisco, California, March 2010.

Game Developer's Conference, San Francisco, California, March 2008.

"Establishing the Entertainment Computing Laboratory for Undergraduate Education and Research", University Grant, Angelo State University, January 2008, \$37,000.

Angelo Science Partnership for Undergraduate Recruitment, Retention, and Success (SPURRS), National Science Foundation #08-569-STEP, 2008, \$999,294. Co-PI.

Name				
Bo Sun, Professor, Tenured				
Education				
	Degree	Field	Institution	Date
	Ph.D.	Computer Science	Texas A&M University	2004
	M.S.	Computer Communications	Beijing University of Posts & Telecommunications	1999
	B.E.	Computer Communications	Nanjing University of Posts & Telecommunications	1996
Academic Experience				
<ul style="list-style-type: none"> Professor, Department of Computer Science, Lamar University, 2016-present. Associate Professor, Department of Computer Science, Lamar University, 2009-2016. Assistant Professor, Department of Computer Science, Lamar University, 2004-2009. 				
Honors and Awards				
<ul style="list-style-type: none"> MRI: Acquisition of Equipment to Develop an Ubiquitous Wireless Sensor Network for Measurement, Modeling, and Prediction in Water Resource Management, National Science Foundation, \$216,000, 09/01/2014 – 08/31/2018, PI, Award No: CNS-1427838 MRI: Acquisition of Equipment to Develop an Energy Efficient and Reliable Wireless Sensor Network for Urban Landscape Irrigation Management System, National Science Foundation, \$214,363, 09/01/2009 – 08/31/2013, PI, Award No; CNS-0922888 Collaborative Research: Module-based Courseware and Laboratory Development for Teaching Secure Wireless Sensor Networks, National Science Foundation, \$71,324, 04/01/2007 – 12/31/2009, PI, Award No: DUE-0633445 Secure Aggregation for Large scale Wireless Sensor Networks, Texas Advanced Research Program, June 2006 – June 2008, PI, \$48,781, ARP – 003581-0006-2006. Numerous Research Enhancement Grants (REG) from Lamar University 				
Service Activities				
<ul style="list-style-type: none"> Associate Editor, International Journal of Sensor Networks, Sept. 2010 – Present Reviewer for IEEE Transactions on Wireless Communications, IEEE Transactions on Vehicular Technology, International Journal on Sensor Networks, International Journal of Security and Networks, EURASIP Journal on Wireless Communications and Networking, IEEE Transactions on Parallel and Distributed Systems, (Wiley) Wireless Communications and Mobile Computing Program Committee, IEEE Global Communications, IEEE International Conference on Communication, IEEE Wireless Communications and Networking 				
Recent Publications				
<ul style="list-style-type: none"> C. Fu, David Sta Cruz, B. Sun, and Guang Sun, “An IoT Prototype System for Environmental Sustainability”, Vol. 28, No. 3, pp. 189-201, International Journal of Sensor Networks, 2018. B. Sun, F. Sun, and Q. Qian, “Development of Wireless Sensor Networks (WSNs) for Water Quality Monitoring”, Proceedings of World Environment and Water Resources Congress (EWRI), West Palm Beach, FL, May 22-26, 2016. M. Peng, Y. Xiao, and B. Sun, "Utilisation and energy consumption of fair-access in 				

sensor networks with selected grid topologies," International Journal of Ad Hoc and Ubiquitous Computing, Vol. 24, Nos. 1/2, 2017, pp. 117-133. DOI: 10.1504/IJAHUC.2017.10001710

- Lei Zeng, Yang Xiao, Hui Chen, Bo Sun, and Wenlin Han, "Computer Operating System Logging and security Issues: a Survey", Security and Communication Networks 9 (17), 4804-4821, 2016.
- B. Sun, F. Ahmed, F. Sun, Q. Qian, and Y. Xiao, "Water Quality Monitoring using STORM 3 Data Loggers and a Wireless Sensor Network", International Journal of Sensor Networks, Volume 20 Issue 1, January 2016, Pages 26-36.
- Yegui Cai, Richard Yu, Chengchao Liang, Bo Sun, and Qiao Yan, "Software Defined Device-to-Device (D2D) Communications in Virtual Wireless Networks with Imperfect Network State Information (NSI)", Vol. 65, No. 9, IEEE Transactions on Vehicular Technology, 2016, pp. 7349-7360.
- Bo Sun, Frank Sun, and Qin Qian, "Deployment of STORM3 Data Loggers to Monitor Water Quality", Proceedings of EWRI Congress, Austin, TX, May 17-21, 2015.
- Fnu Shalini, Y. Xiao, and B. Sun, "ProtoGENI Experiments", International Journal of Sensor Networks, Volume 10 Issue 4, October 2015, Pages 239-254.
- Bo Sun, Md Abu Shufean, and Frank Sun, "A Geographic Information System Framework for Data Visualization in Wireless Sensor Networks", Internal Journal of Sensor Networks, vol. 15, No. 1, pp. 51-61, 2015.
- Farhad Ahmed, Bo Sun, and Qin Qian, "Development and Implementation of Wireless Sensor Networks for Measuring Water Quality", World Environment and Water Resources Congress (EWRI) 2014.

Recent Professional Development Activities

- Undergraduate Advisor for Juniors and Seniors in Computer Science Department: a. Closely work with University Advising Center (UAC) to provide quality advising to all Computer Science Undergraduate students; b. Periodically check degree plans and degree audits of all CS students; c. Work with Department Chairs on course transfer. 2012 to present
- Attend Security Education Workshop, University of Houston – Clear Lake, Houston, TX, April 5, 2019.
- Visitor – Dept. of Electrical and Computer Engineering, University of Houston, TX 2018.
- Lamar University NSF MRI proposal discussion panel, 2017
- National Science Foundation (NSF) Course, Curriculum, and Laboratory (CCLI) Panelist, 2008
- Accreditation Board for Engineering and Technology (ABET) Conference, Pittsburg, PA 2008.
- Attend IEEE Global Communications Conferences (St. Louis MO, 2005; Houston TX, 2011); ACM Int. Conference on Mobile Computing and Networks (Philadelphia, Sept. 2004); ACM Workshop on Wireless Security (Philadelphia, Sept. 2004).

Name				
Sujing Wang, Assistant Professor, tenure-track				
Education				
	Degree	Field	Institution	Date
	Ph.D.	Computer Science	University of Houston	2014
	M.S.	Computer Science	University of Houston	2005
	M.E.	Computer Science	Tianjin University	2000
	B.S.	Computer Science	Tianjin Polytechnic University	1997
Academic Experience				
<ul style="list-style-type: none"> Assistant Professor, Department of Computer Science, Lamar University, 2014-present. Lecturer, Department of Computer Science, Lamar University, 2006-2014. Graduate Teaching/Research Assistant, Computer Science Department, University of Houston, 2002- 2005. 				
Current Membership in Professional Organizations				
<ul style="list-style-type: none"> Association for Computing Machinery (ACM) Association for Computing Machinery-Woman (ACM-Women) Computer Science Teachers Association (CSTA) Anita Borg Institute Asian Women in Computing (AsianWiC) 				
Honors and Awards				
<ul style="list-style-type: none"> Best presentation award of 2017 IEEE ICBDA Conference, 2017 Best paper award of 2017 AIChE Environmental Division, 2017, 2016 ACM CRA-W 2016 Early Career Mentoring Scholarship, 2016, 2015 NSF Travel Award for GeoComputation 2015 Conference, 2015 				
Service Activities				
<ul style="list-style-type: none"> Program Committee, Grace Hopper Celebration 2019 (GHC19) of Women in Computing Data Science Program Program Committee, ACM SIGCSE 2019 Conference Technical Committee, 2019 IEEE 4th International Conference on Big Data Analysis (ICBDA 2019) Program Committee, Grace Hopper Celebration 2018 (GHC18) of Women in Computing Data Science Program Publicity Chair, 2018 IEEE 3rd International Conference on Big Data Analysis (ICBDA 2018) Session Chair, 2018 IEEE 3rd International Conference on Big Data Analysis (ICBDA 2018) Session Chair, 2017 IEEE 2nd International Conference on Image, Vision and Computing Workshops on Database and Data Mining Program Committee, Grace Hopper Celebration 2017 (GHC 17) of Women in Computing Data Science Program Program Committee, ACM SIGKDD 2017 Broadening Participation in Data Mining Workshop (BPDW) 				
Recent Publications				

(+student author, *corresponding author)

- R. Banerjee+, K. Elgarroussi+, S. Wang*, A. Talari, Y. Zhang, and C. F. Eick*, “K2: A Novel Data Analysis Framework to Understand US Emotions in Space and Time”, The International Journal of Semantic Computing, 13(01):111-133, March 2019.
- K. Elgarroussi+, S. Wang*, R. Banerjee+, and C. F. Eick*, “Aconcagua: A Novel Spatio-temporal Emotion Change Analysis Framework”, in Proceedings of the ACM SIGSPATIAL 2nd International Workshop on AI for Geographic Knowledge Discovery (GeoAI 2018), Seattle, Washington, USA, November 6-9, 2018 (Best Paper Award).
- R. Banerjee+, K. Elgarroussi+, S. Wang*, Y. Zhang+ and C. F. Eick*, “Tweet Emotion Mapping: Understanding US Emotions in Time and Space”, in Proceedings of IEEE International Conference on Artificial Intelligence and Knowledge Engineering (AIKE 2018), Laguna Hills, CA, USA, Sept. 26-28, 2018.
- R. Banerjee+, C. F. Eick*, K. Elgarroussi+, S. Wang*, and Y. Zhang+, “A Framework to Analyze Change in US Emotions”, 2018 Data Science Conference, Houston, TX, USA, Oct. 8-9, 2018.
- A. M. Aryal+ and S. Wang*, “Spark-SNN: Density-based Clustering on Spark”, in Proceedings of 2018 IEEE 3rd International Conference on Big Data Analysis (ICBDA 2018), Mar. 9-12, 2018.
- K. Kang+ and S. Wang*, “Analyze and Predicate for College Student Online Program Dropout”, in Proceedings of ACM 2nd International Conference of Compute and Data Analysis (ICCD 2018), Dekalb, IL, USA, Mar. 23-25, 2018.
- S. Wang* and C. F. Eick, “A Clustering and Analysis Framework for Mining Spatio-temporal Data” International Journal of Data Science and Analytics (2018), 5:81.
- A. M. Aryal+ and S. Wang*, “Discovery of Patterns in Spatial-temporal Data Using Clustering Techniques”, in Proceedings of 2017 IEEE 2nd International Conference on Image, Vision and Computing Workshops on Database and Data Mining (ICDDM 2017), June 2-4, 2017.
- Y. Zhang+, S. Wang*, A. M. Aryal+, and C. F. Eick, “Serial versus Parallel: a Comparison of Spatio-temporal Clustering Approaches”, International Symposium on Methodologies for Intelligent Systems, Foundations of Intelligent Systems. ISMIS 2017, vol. 10352. pp 396-403, 2017.
- S. Wang* and C. F. Eick, “MR-SNN: Design of Parallel Shared Nearest Neighbor Clustering on Hadoop”, in Proceedings of 2017 IEEE 2nd International Conference on Big Data Analysis (ICBDA 2017), March 10-12, 2017 (Best Presentation Award).

Recent Professional Development Activities

Dell High Performance Computing Clustering (HPC) Management Workshop, Dell, 11/7/2018

National Science Foundation Panelist Webex Training Session, NSF, 12/5/2018

Grace Hopper Conference Committee Member Training, Anita B Org, 3/5/2019

Advancing Research Networks through Federal Grants, CISCO WebEx Training, 4/3/2018

National Science Foundation Review Panel Online Training, NSF, 12/06/2017

Name				
Jing Zhang, Assistant Professor, Tenure-track				
Education				
	Degree	Field	Institution	Date
	Ph.D.	Computer Science and Engineering	University of South Florida, Tampa, Florida, USA	2012
	M.S.	Electrical Engineering	Xi'an Jiaotong University, Xi'an, Shaanxi, China	2004
	B.E.	Electrical Engineering	Northwest University, Xi'an, Shaanxi, China	2000
Academic Experience				
<ul style="list-style-type: none"> Assistant Professor, Department of Computer Science, Lamar University, 2014-present. Postdoctoral Associate, Department of Radiology, Duke University, 2012-2014 				
Current Membership in Professional Organizations				
<ul style="list-style-type: none"> The Institute of Electrical and Electronics Engineers (IEEE) 				
Honors and Awards				
<ul style="list-style-type: none"> Summer Faculty Research Award, Lamar University, 2017 Best Poster Award, College of Engineering, University of South Florida, Oct. 2010 Symbol Recognition Contest Contribution Award, the 6th International Workshop on Graphics Recognition, International Association of Pattern Recognition, Hong Kong, 2005 				
Service Activities				
<ul style="list-style-type: none"> Technical Program Committee: the 2nd International Conference On Image, Video and Signal Processing, 2020; ; the 4th IEEE International Conference on Image, Vision, and Computing, 2019; the 4th IEEE International Conference on Signal and Image Processing, 2019; the 1st International Conference on Image, Video, and Signal Processing, 2019; the 3rd IEEE International Conference on Image, Vision, and Computing, 2018 Paper Peer Reviewer: IEEE Transaction on Pattern Analysis and Machine Intelligence, IEEE Transaction on Image Processing, Pattern Recognition, IET Image Processing, Journal of Electronic Imaging, IEEE Journal of Biomedical and Health Informatics, Multimedia Tools and Application, Image and Vision Computing, Computer Methods and Programs in Biomedicine, Journal of Medical Imaging, IEEE International Conference on Image, Vision, and Computing, Medical Image Analysis Grant Reviewer: National Science Foundation MRI grant (NSF MRI), Republic of Georgia's Shota Rustaveli National Science Foundation grant (SRNSF), Advisor of ACM chapter at Lamar University and Coach of Lamar ACM programming team Committee Chair for three master thesis and Committee Chair for eight master student graduate projects, Committee member for 3 Doctor of Engineering dissertations, 8+ master student theses, 30+ master student graduate projects at Lamar university 				
Publication				
(Zhang's advisees indicated by: undergraduates [†] and graduate students [‡])				
<ul style="list-style-type: none"> Zanbo Zhu[‡], Ruobing Zhao[‡], Jianyuan Ni[‡], and Jing Zhang, "Image and Spectrum based 				

Deep Feature Analysis for Particle Matter Estimation with Weather Information”, IEEE International Conference on Image Processing (ICIP), Taipei, Taiwan, Sept. 2019

- Xingxia Ming, Hongwei Feng, Qirong Bo, Jun Feng, Jing Zhang, and Gang Yang, “HumanFi: WiFi-Based Human Identification Using Recurrent Neural Network LSTM”, IEEE International Conference on Ubiquitous Intelligence Computing, UK, August 2019
- Zanzo Zhu[‡], Md Alam[‡], Berna Tokgoz, Seokyon Hwang, and Jing Zhang, “Automatic Utility Pole Inclination Angle Measurement Using Unmanned Aerial Vehicle and Deep Learning”, Institute of Industrial and System Engineers Annual Conference, Orlando, 2019.
- Md Alam[‡], Zanzo Zhu[‡], Jing Zhang, Seokyon Hwang, and Berna Tokgoz, “Resilience Enhancements of Power Distribution Lines Using Computer Vision Technology”, Institute of Industrial and System Engineers Annual Conference, Orlando, FL, May, 2019.
- Rijal Nabin[‡], Ravi Teja Gutta[‡], Tingting Cao, Jerry Lin, Qirong Bo, and Jing Zhang. "Ensemble of Deep Neural Networks for Estimating Particulate Matter from Images." IEEE 3rd International Conference on Image, Vision and Computing, pp. 733-738. IEEE, 2018.
- Vinaya Manchaiah, Monica Harn, Michael Azios, Yueqing Li, Jing Zhang, and Farzan Irani, “Text Pattern Analysis of Large Secondary Data from Media in Speech and Hearing Sciences”, American Speech-Language-Hearing Association Convention, 2018
- Avijoy Chakma[‡], Ben Vizona[‡], Tingting Cao, Jerry Lin, and Jing Zhang, “Image-Based Air Quality Analysis Using Deep Learning Neural Network”, In Proceedings of the IEEE International Conference on Image Processing, (ICIP), Beijing, China, Sept. 2017
- Li, Guanlong[‡], Yueqing Li, Jing Zhang, and Xiao Zhang. "A Design Feature and Cross-Culture Based Comparative Evaluation of Web Maps." In Proceedings of the Human Factors and Ergonomics Society Annual Meeting, vol. 61, no. 1, pp. 818-822. Sage CA: Los Angeles, CA: SAGE Publications, 2017.

Recent Professional Development Activities

Monitoring the Health Conditions of Utility Poles and Vegetation Clearance Using Unmanned Aerial Vehicle and Deep Learning Neural Network, PI, \$3800.00, the Center of Innovation, Commercialization and Entrepreneurship (CICE), Lamar University, 2019

Develop A Collaborative Unmanned System to Enhance Port, Co-PI, \$25,000, Center for Advances in Port Management, Lamar University, 2019.

NSF:REU: Acquisition of a Hybrid CPU/GPU High Performance Computing Cluster for Research and Education at Lamar University, PI, Awarded, \$24,000, National Science Foundation (NSF), 2018

NSF:MRI: Acquisition of a Hybrid CPU/GPU High Performance Computing Cluster for Research and Education at Lamar University, PI, Awarded, \$516,013.00, NSF, 2017

Image-based Air Quality Analysis Using Deep Learning Convolutional Neural Network, Summer Faculty Research Award, PI, Awarded, \$8000.00, Lamar University, 2017

Unmanned Aerial Vehicle for Air Quality Monitoring, PI, Awarded, \$2500.00, the Center of Innovation, Commercialization and Entrepreneurship (CICE), Lamar University, 2017

Atmospheric Visibility Monitoring and Haze Level Estimation Using Computer Vision and Machine Learning Techniques, PI, Awarded, \$20,900.00, Center for Advances in Water and Air Quality, Lamar University, 2016

Appendix C – Equipment

The Department of Computer Science has six open labs for students, six faculty research labs, one GPU education lab, and one game development lab. Open labs can be used by all university students including computer science students. There is a total of approximately 400 pieces of hardware including computers, projectors and printers in the department inventory list. All computers in the open labs are on a 3-year upgrade schedule. Research lab computer upgrades are based on a faculty member's research funds. Following is a list of the hardware and software in each open lab:

Lab 208

Linux – 22 machines

Linux CentOS

Lab 212

Windows – 36 machines

MATLAB

Microsoft Office

Microsoft Visual Studio

Netbeans

Notepad++

Scratch

WinSCP

R Studio

Eclipse

OpenScad

Stencyl

Lab 213

Windows – 26 machines

Adobe Creative Suite

Android SDK Tools

GameStudio A8

MATLAB

Microsoft Office

Microsoft Visual Studio

Netbeans

Notepad++

Scratch

WinSCP

Xming

Stencyl

Eclipse

Lab 214

Windows - 2 machines

Netbeans

Eclipse

PuTTY

Microsoft Office

Notepad++

MATLAB

Adobe Creative Suite

Linux – 10 machines

CentOS or Ubuntu

Macintosh – 10 machines

Adobe Creative Suite

Microsoft Office

Lab 215

Windows – 24 machines

Microsoft Office

Netbeans

Eclipse

MATLAB

Notepad++

PuTTY

Scratch

Lab 218

Windows – 20 machines

Microsoft Office

Microsoft Visual Studio

Newtek Lightwave 3D

Eclipse

Notepad++

PuTTY

Android Studio

Department Server

5 Dell PowerEdge servers with Linux OS

8 each SUN Sunfire Server with Linux OS

1 Dell PowerVault MD 3600 Storage

2 SUN Racks

1 Dell HPC cluster with 2 head nodes, 1 login node, and 46 computing nodes includes 2 GPU nodes, 1 Big Memory node.

Appendix D – Institutional Summary

1. The Institution

a. Name and address of the institution

Lamar University
4400 S. ML King Jr. Parkway
Beaumont, Texas 77710

b. Name and title of the chief executive officer of the institution

Dr. Kenneth R. Evans, President

c. Name and title of the person submitting the Self-Study Report.

Dr. Timothy E. Roden, Associate Professor, Department of Computer Science

d. Name the organizations by which the institution is now accredited and the dates of the initial and most recent accreditation evaluations.

Southern Association of Colleges and Schools Commission on Colleges. Most recent evaluation: 2010. Next site visit: April 2020.

2. Type of Control

Lamar is a state-sponsored public university governed by the Texas State University System Board of Regents.

3. Educational Unit

The Department Chair is Dr. Stefan Andrei who reports to the Dean of the College of Arts & Sciences. The Dean of the college is Dr. Lynn M. Maurer who reports to the Provost. The Provost is Dr. James Marquart who reports to the President. The President is Dr. Kenneth R. Evans.

4. Academic Support Units

Art – Donna M. Meeks, Chair

Biology – Dr. Randall Terry, Interim Chair

Chemistry & Biochemistry – Dr. Xiangyang Lei, Interim Chair

Communication – Dr. Natalie Tindall, Chair

Computer Science – Dr. Stefan Andrei, Chair

Electrical Engineering – Dr. Harley R. Myler, Chair

English & Modern Languages – Dr. Jim Sanderson, Chair

History – Dr. Mark A. Mengerink, Chair

Mathematics – Jeremy Alm, Chair

Music – Dr. Brian Shook, Chair

Political Science – Dr. Thomas Sowers, Interim Chair

Psychology – Dr. Edythe Kirk, Chair

Sociology, Social Work & Criminal Justice – Dr. Stuart Wright, Chair

5. Non-academic Support Units

Alumni Affairs – Linda LeBlanc, Director

Computing facilities – Priscilla Parsons, Vice President for Information Technology
Finance – Mr. E. Craig Ness, Vice President for Finance and Operations
Library – Dr. Arne Almquist, Dean, Mary and John Gray Library
Public Relations – Brian Sattler, Director
Placement & Tutoring – Ms. Rachel Hoover, Director of STAR Services

6. Credit Unit

Computer science laboratory classes meet for 1 hour and 20 minutes per credit hour. Other laboratory classes (such as science labs) can meet for longer periods up to 3 hours per credit hour.

7. Tables

See tables D-1 and D-2, below, for more information about the program.

Table D-1. Program Enrollment and Degree Data

Department of Computer Science, Lamar University

Academic Year	Enrollment Year				Total Undergrad	Degrees Awarded
	1st	2nd	3rd	4 th		
Current Year	52	47	29	54	183	19
2017	96	79	65	128	368	20
2016	77	73	54	89	293	15
2015	91	47	61	76	275	17
2014	43	28	42	54	167	21

(Current Year) Year 2018 → Degrees Awarded Fall 2018 - Spring 2019 (summer 2019 data not yet available)

Year 2017 → Degrees Awarded Fall 2017 - Summer 2018

Year 2016 → Degrees Awarded Fall 2016 - Summer 2017

Year 2015 → Degrees Awarded Fall 2015 - Summer 2016

Year 2014 → Degrees Awarded Fall 2014 - Summer 2015

1st = Freshman

2nd = Sophomore

3rd = Junior

4th = Senior

Note: A distinction was not made between full and part time students since the number of students in each cell of Table D-1 represents students enrolled in an academic year. In some cases a student may be full time in the fall semester, for example, but part-time in the spring semester.

Table D-2. Personnel

Department of Computer Science, Lamar University

Year¹: Fall 2019

	HEAD COUNT		FTE
	Full Time	Part Time	
Administrative ²	1		1
Faculty (tenure-track) ³	11		11
Other Faculty (excluding student Assistants)	2		2
Student Teaching Assistants ⁴		12	12
Technicians/Specialists	2	6	8
Office/Clerical Employees		1	1
Others ⁵			

¹ Data on this table should be for the fall term immediately preceding the visit. Updated tables for the fall term when the ABET team is visiting are to be prepared and presented to the team when they arrive.

² Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category.

³ For faculty members, 1 FTE equals what your institution defines as a full-time load.

⁴ For student teaching assistants, 1 FTE equals 20 hours per week of work (or service). For undergraduate and graduate students, 1 FTE equals 15 semester credit-hours (or 24 quarter credit-hours) per term of institutional course work, meaning all courses — science, humanities and social sciences, etc.

⁵ Specify any other category considered appropriate, or leave blank

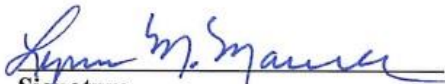
Signature Attesting to Compliance

By signing below, I attest to the following:

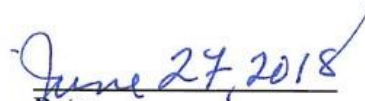
That B.S. in Computer Science has conducted an honest assessment of compliance and has provided a complete and accurate disclosure of timely information regarding compliance with ABET's *Criteria for Accrediting Computing Programs* to include the General Criteria and any applicable Program Criteria, and the ABET *Accreditation Policy and Procedure Manual*.

Lynn M. Maurer

Dean, College of Arts & Sciences
Lamar University



Signature



Date