Supplemental Appendices

ABET Annual Report

for the

B.S. in Computer Science

at

Lamar University

Beaumont, Texas

August 30, 2024

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Appendix E – Assessment Methodology 2023-2024

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Direct Measures

1. Rubrics and Test Questions for evaluating direct performance criteria

Indirect Measures

1. Student Evaluation Questions on Course Evaluations: given every semester
2. Exit Interviews of Graduating Seniors: given every semester to graduating seniors in Senior Seminar (COSC 4272).
3. Exit Surveys of Graduating Seniors: given every semester to graduating seniors in Senior Seminar (COSC 4272).
4. Alumni Surveys**:** given every two years
5. Advisory Board Feedback
6. Standardized ETS Exams: given every semester to graduating seniors in Senior Seminar (COSC 4272).

E.1 - Procedures for Direct Measure of Student Outcomes

Department of Computer Science, Lamar University

Criteria Used to Evaluate Rubrics and Test Questions for Direct Measures

The department will use percentage of students that are adequate or better in 2023-2024. The target is at least 80% out of the students who pass a course meet each performance criterion in 2023-2024. The target will be at least 80% of the students in a course do acceptable work on each performance criterion.

Using the feedback from the indirect measures and the results from our direct measures, the analysis of our assessment findings, actions taken, and recommendations for improvement are presented at the end of these tables for each Student Outcome. In addition to the table below with direct measures, we include in our analysis the following indirect assessment methods: Student Evaluation, Exit Interview, Alumni Survey, and ETS Scores.

Note on Tables Below

* Courses contain material relevant to the performance criteria but are not used in the assessment strategy at this time.

Student Outcome 1 Software Fundamentals

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[1.1] Apply UML interaction diagrams and class diagrams to illustrate object models.	COSC 1336, COSC 1337, COSC 2336, CPSC 4360	Selected Questions on Final Exam	CPSC 4360	Spring and Fall of each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[1.2] Apply important design patterns to OOD.	COSC 3308, CPSC 4360	Selected Questions on Final Exam	CPSC4360	Spring and Fall of each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[1.3] Create useful software architecture documentation.	COSC 2336, COSC 3304, CPSC 4317, CPSC 4302, CPSC 4340 CPSC 4360	Rubric on software architecture documentation on final project	CPSC 4340	Fall of each year	Dr. Kami Makki	Size = Percentage = The target of 80% was _____.
[1.4] Develop correct and efficient programs.	COSC 1336, COSC 1337, COSC 2336, COSC 3304, CPSC 4317, *CPSC 4302, *CPSC 4340 *CPSC 4360	Selected Questions on Assignments	COSC 3304	Spring of each year	Dr. T. Roden	Size = Percentage = The target of 80% was _____.
[1.5] Debug implemented software in a proficient	COSC 1336, COSC 1337, COSC 2336	Selected Questions on Assignments	COSC 2336 and COSC 2372	Spring of each year	Dr. T. Roden	Size = Percentage = The target of

manner.	COSC 2372					80% was _____.
[1.6] Design user interfaces appropriate to a large software system	COSC 1336 COSC 1337 CPSC 4317 CPSC 4360	Rubric	CPSC 4360	Fall and Spring of Each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[1.7] Develop user-level documentation for software	All courses with programming assignments	Rubric	CPSC 4360 and COSC 2336	Fall and Spring each year	Dr. Stefan Andrei Dr. Makki	Size = Percentage = The target of 80% was _____.

Student Outcome 2.1 Computer Science Technology Skills – Discrete Mathematics and Structures

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.1.1] Be able to develop software to support specific operations on frequently used discrete structures such as lists, trees, and graphs.	COSC 2336 COSC 4302 CPSC 4317	Code development on final exams	COSC 2336	Fall and Spring of each year	Dr. Kami Makki and Dr. Zhang	Size = Percentage = The target of 80% was _____.
[2.1.2] Be able to use elementary concepts of combinatorics, probability, and statistics to analyze and evaluate the efficiency of algorithms.	COSC 3304	Selected Questions on Midterm Exam in COSC 3304	COSC 3304	Spring of each year	Dr. Zhang	Size = Percentage = The target of 80% was _____.
[2.1.3] Be able to use concepts of discrete mathematics, automata, and finite state machines to explain the design of computer hardware.	COSC 2336 COSC 2372 COSC 3302	Selected Questions on Final Exam in COSC 3302	COSC 3302	Spring of each year	Dr. Zhang	Size = Percentage = The target of 80% was _____.

Student Outcome 2.2 Computer Technology Skills – Analysis and Design of Algorithms

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.2.1] Demonstrate basic understanding of asymptotic notations and time complexity.	COSC 2336 COSC 3304	Questions from Midterm Exam	COSC 3304	Spring each year	Dr. Makki	Size = Percentage = The target of 80% was _____.
[2.2.2] Design efficient algorithms and compare competing designs.	COSC 2336, COSC 3304 CPSC 4360	Questions from Midterm Exam	COSC 3304	Spring each year	Dr. Makki	Size = Percentage = The target of 80% was _____.
[2.2.3] Demonstrate basic understanding of some design approaches such as greedy algorithms, dynamic programming and divide-and-conquer.	COSC 2336, COSC 3304	Questions from Midterm Exam	COSC 3304	Spring each year	Dr. Makki	Size = Percentage = The target of 80% was _____.
[2.2.4] Demonstrate familiarity with standard searching and sorting algorithms and linear and non-linear structures.	COSC 2336 COSC 3304	Questions from Midterm Exam	COSC 3304	Spring each year	Dr. Makki	Size = Percentage = The target of 80% was _____.

Student Outcome 2.3 Computer Science Technology Skills – Formal Languages and Computability Theory

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.3.1] Demonstrate basic knowledge of equivalences between various types of languages and corresponding accepting devices including Turing Machines.	COSC 3302	Exam questions	COSC 3302	Spring Semester	Dr. Andrei	Size = Percentage = The target of 80% was _____.
[2.3.2] Demonstrate basic knowledge of practical applicability of various types of grammar and of some standard representation forms.	COSC 3302	Exam questions	COSC 3302	Spring Semester	Dr. Andrei	Size = Percentage = The target of 80% was _____.
[2.3.3] Demonstrate knowledge of limitations of computational capability of computer grammars.	COSC 3308 COSC 3302	Exam questions	COSC 3302	Spring Semester	Dr. Andrei	Size = Percentage = The target of 80% was _____.
[2.3.4] Demonstrate basic knowledge of equivalences and normal forms of	COSC 3308 COSC 3302	Exam questions	COSC 3302	Spring Semester	Dr. Andrei	Size = Percentage = The target of 80% was

logical formulas in propositional logic.	COSC 2375					_____.
[2.3.5] Demonstrate basic understanding and appreciation of the various essential programming languages constructs, paradigms, evaluation criteria, and language implementation issues.	COSC 3308	Exam questions	COSC 3308	Fall Semester	Dr. Andrei	Size = Percentage = The target of 80% was _____.
[2.3.6] Demonstrate basic knowledge and skills in programming techniques with the focus on concepts and not on a particular language.	COSC 3308	Exam questions	COSC 3308	Fall Semester	Dr. Andrei	Size = Percentage = The target of 80% was _____.

Student Outcome 2.4 Computer Science Technology Skills – Operating Systems

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.4.1] Knows the main components of an operating system and their purposes and modes of interaction.	COSC 4302	Exam Questions	COSC 4302	Fall and Spring Semesters	Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[2.4.2] Knows the structure of device drivers and the interaction between device drivers and operating systems.	COSC 4302	Exam Questions	COSC 4302	Fall and Spring Semesters	Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[2.4.3] Outlines the basic issues in memory management design and virtual memory	COSC 4302	Exam Questions	COSC 4302	Fall and Spring Semesters	Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[2.4.4] Can develop basic system applications based on operating system APIs.	COSC 4302 CPSC 4317	Exam Questions	COSC 4302	Fall and Spring Semesters	Dr. Bo Sun	Size = Percentage = The target of 80% was _____.

Student Outcome 2.5 Computer Science Technology Skills – Database Design

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.5.1] Demonstrate the application of Entity-Relational diagrams to model real world problems.	CPSC 4340	Exam Questions	CPSC 4340	Fall Semester	Dr. Kami Makki	Size = Percentage = The target of 80% was _____.
[2.5.2] Design relations for real world problems including implementation of normal forms, keys, and semantics constraints for each relation.	CPSC 4340 CPSC 4360	Exam Questions	CPSC 4340	Fall Semester	Dr. Kami Makki	Size = Percentage = The target of 80% was _____.
[2.5.3] Demonstrate competence in implementations of database applications.	CPSC 4340	Rubric for final project	CPSC 4340	Fall Semester	Dr. Kami Makki	Size = Percentage = The target of 80% was _____.

Student Outcome 2.6 Computer Science Technology Skills – Computer Networks

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.6.1] Employ the socket API to program applications among independent hosts.	CPSC 4317	Exam Questions	CPSC 4317	Fall Semester	Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[2.6.2] Explain common network architectures, the services provided by each layer, and the protocols required for connecting peer layers.	CPSC 4317	Exam Questions	CPSC 4317	Fall Semester	Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[2.6.3] Evaluate network models through simulation and the use of common performance metrics for networks.	CPSC 4317	Project	CPSC 4317	Fall Semester	Dr. Bo Sun	Size = Percentage = The target of 80% was _____.

Student Outcome 2.7 Computer Science Technology Skills –Computer Organization and Architecture

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.7.1] Understands modern ISA design principles and employs them to evaluate systems	COSC 2372, COSC 4310	Local Exam Question	COSC 4310	Spring and Fall semesters	Dr. Jiangjiang Liu	Size = Percentage = The target of 80% was _____.
[2.7.2] Know how to measure performance for different computer architectures	COSC 4310	Local Exam Question	COSC 4310	Spring and Fall semesters	Dr. Jiangjiang Liu	Size = Percentage = The target of 80% was _____.
[2.7.3] Demonstrate knowledge of hardware implementation of numbers and arithmetic operations	COSC 2372, COSC 4310	Local Exam Question	COSC 4310	Spring and Fall semesters	Dr. Jiangjiang Liu	Size = Percentage = The target of 80% was _____.

Student Outcome 3 Scientific Method**

**Graduates will be able to gather requirements, analyze, design and conduct simulations or other computer experiments in order to evaluate and interpret the data.

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[3.1] Be able to justify why selected research methods were chosen and state the intended outcomes of the study.	COSC 2336, CPSC 4317, COSC 4310	Rubric and Project	CPSC 4317 and COSC 4310	Spring and Fall of every year	Dr. Jiangjiang Liu and Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[3.2] Identify steps used in a particular study.	COSC 2336, CPSC 4317, COSC 4310	Rubric and Project	CPSC 4317 and COSC 4310	Spring and Fall of every year	Dr. Jiangjiang Liu and Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[3.3] Be able to outline and explain the key features of the adopted method.	COSC 2336, CPSC 4317, COSC 4310	Rubric and Project	CPSC 4317 and COSC 4310	Spring and Fall of every year	Dr. Jiangjiang Liu and Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[3.4] Analyze and interpret collected data based on the adopted method	COSC 2336, CPSC 4317,	Rubric and Project	CPSC 4317 and COSC	Spring and Fall of every	Dr. Jiangjiang Liu and Dr.	Size = Percentage =

and draw appropriate conclusions.	COSC 4310		4310	year	Bo Sun	The target of 80% was _____.

Student Outcome 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.

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[4.1] Demonstrate understanding of evolving computer technology applications.	COSC 1172, COSC 3325	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[4.2] Demonstrate knowledge of positive social impacts including information globalization, E-Commerce, E-learning and new job creation.	COSC 1172, COSC 3325, CPSC 4340, CPSC 4317	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[4.3] Demonstrate knowledge of negative social impacts including internet pornography, privacy violation, health hazards, computer crimes and dehumanization.	COSC 1172, COSC 3325, CPSC 4340, CPSC 4317	Exam Questions	COSC 3325, CPSC 4317	Fall and Spring each year	Dr. Stefan Andrei, Dr. Bo Sun	Size = Percentage = The target of 80% was _____.
[4.4] Demonstrate basic understanding of intellectual property protection via copyright and patent law and fair use exception for copyrighted software.	COSC 1172, COSC 3325, CPSC 4340, CPSC 4360	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.

Student Outcome 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.

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[5.1] Know the differences of various philosophical views on ethics such as deontology, utilitarianism, egoism, and relativism.	COSC 3325	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[5.2] Understand the ACM or a similar professional body's code of ethics and principles underlying those ethics.	COSC 3325, CPSC 4360	Exam Questions	CPSC 4360	Fall Spring each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[5.3] Honor the property rights of others including copyrights and patents.	COSC 1172, COSC 3325, CPSC 4360	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[5.4] Demonstrate ability for ethical decision making within the computer profession.	COSC 1172, COSC 3325, CPSC 4317, CPSC 4360	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was

						_____.
[5.5] Demonstrate knowledge of factors affecting fair resolution of conflicts of interests.	COSC 1172, COSC 3325, CPSC 4360	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.

Student Outcome 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.

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[6.1] Demonstrate the ability to work in heterogeneous environments which are diverse in gender, ethnicity, and academic accomplishment.	CPSC 4360, CPSC 4340, COSC 4302	Rubrics	CPSC 4340, CPSC 4360	Fall and Spring Semesters	Dr. Andrei, Makki	Size = Percentage = The target of 80% was _____.
[6.2] Attend team meetings and contribute towards solution of technical problems during the meetings.	CPSC 4360, CPSC 4340, COSC 4302	Rubrics	CPSC 4340, CPSC 4360	Fall and Spring Semesters	Dr. Andrei, Makki	Size = Percentage = The target of 80% was _____.
[6.3] Make appropriate contributions within their skill set to the completion of the project.	CPSC 4360, CPSC 4340, COSC 4302	Rubrics	CPSC 4340, CPSC 4360	Fall and Spring Semesters	Dr. Andrei, Makki	Size = Percentage = The target of 80% was _____.
[6.4] Demonstrate a sense of interdependence with other team members.	CPSC 4360, CPSC 4340, COSC 4302	Rubrics	CPSC 4340, CPSC 4360	Fall and Spring Semesters	Dr. Andrei, Makki	Size = Percentage = The target of 80% was _____.

Student Outcome 7 Oral Communications**

**Graduates will demonstrate their ability to verbally communicate clearly.

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[7.1] Demonstrate the ability to communicate in a given situation.	COSC 3325, COSC 4172, COSC 1172	Rubrics	COSC 3325, COSC 4272	Fall and Spring Semesters	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[7.2] Demonstrate the ability to comprehend what is said and to show an appreciation of the importance of listening.	COSC 3325, COSC 4172, COSC 1172	Rubrics	COSC 3325, COSC 4272	Fall and Spring Semesters	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[7.3] Communicate clearly at the level of the audience the technical material intrinsic to the discipline of computer science.	COSC 3325, COSC 4172, COSC 1172	Rubrics	COSC 3325, COSC 4272	Fall and Spring Semesters	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.
[7.4] Demonstrate knowledge of the communication process.	COSC 3325, COSC 4172, COSC 1172	Rubrics	COSC 3325, COSC 4272 CPSC 4360	Fall and Spring Semesters	Dr. Stefan Andrei	Size = Percentage = The target of 80% was _____.

Student Outcome 8 Written Communication Skills**

**Graduates will demonstrate their ability to write effectively both technical and non-technical materials with appropriate multimedia aids.

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[8.1] Provide an introduction that grabs the attention of readers.	COSC 1172, COSC 3325, COSC 4172, CPSC 4360, COSC 4302	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = Percentage = The target of 80% was _____.
[8.2] Organize documents in terms of a few main points or themes.	COSC 1172, COSC 3325, COSC 4172, CPSC 4360, COSC 4302	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = Percentage = The target of 80% was _____.
[8.3] Choose appropriate illustrations, examples, or evidence to support the written documents.	COSC 1172, COSC 3325, COSC 4172, CPSC 4360, COSC 4302	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = Percentage = The target of 80% was _____.
[8.4] Write appropriately for specified readers in terms of technical content.	COSC 1172, COSC 3325, COSC 4172, CPSC 4360, COSC 4302	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = Percentage = The target of 80% was _____.
[8.5] Write organized, grammatically correct reports.	COSC 1172, COSC 3325, COSC 4172, CPSC 4360,	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = Percentage = The target of 80% was

	COSC 4302					_____.

Student Outcome 9 Continuing Education and Lifelong Learning**

**Graduates will be demonstrate they can independently acquire new computing related skills and knowledge in order to pursue either further formal or informal learning after graduation.

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[9.1] Be able to search scholarly publications to assist in resolving problems.	COSC 3325, COSC 4172, COSC 4302, CPSC 4360	Rubrics	COSC 3325 and COSC 4272	Fall and Spring	Dr. Andrei	Size = Percentage = The target of 80% was _____.
[9.2] Intend to engage in additional formal education or participate in employer-related training or research projects.	COSC 4272	Rubrics	COSC 4272	Fall and Spring	Dr. Andrei	Size = Percentage = The target of 80% was _____.
[9.3] Independent study. Participate in Honors program or in undergraduate research at Lamar. This could be done in the STAIRSTEP Program, Presentations or Posters at Professional Conferences, COOP or Internship position reports. Student could own a software design and development company.	COSC 4272	Rubrics	COSC 4272	Fall and Spring	Dr. Andrei	Size = Percentage = The target of 80% was _____.

E.2 - Procedures for Indirect Measure of Student Outcomes

Sources of Data for Evaluations for Each Learning Outcome
Assessment Committee Approved Spring 2013 (Revised Summer 2017)

Outcome	Course Evaluations	Student Evaluation Questions (Done every semester)	Exit Interview Questions (Done every semester by graduating seniors)	Exit Survey Questions (Done every semester by graduating seniors)	Alumni Survey Questions (Partial surveys every two years)	ETS Scores
1	COSC 1336 COSC 1337 COSC 2336 COSC 2372 COSC 3304 CPSC 4317 COSC 4272 COSC 4302 CPSC 4340 CPSC 4360	27, 28, 29, 31 27-31 27,28,30,31,32,38 27,28,30,31,32 27-32 27,28,30,38 27 25,27,28,30,31 25,27-31 25,27-32	1,2,3,6,12		1,2,3,6,12	Overall Average Score and 3 Assessment Indicators (Programming, Computer Organization, Algorithms and Theory)
2			15		15	The 3 Assessment Indicators (Programming, Computer Organization, Algorithms and Theory)
2.1	COSC 2336	27, 28,29,30,31,40				
	COSC 3304	27,37,40				
	COSC 3302	27,39,40				

2.2	COSC 3304	27,28,33,34,39,40				
2.3	COSC 3302	39,40				
2.4	COSC 4302	27,28,35,39,40				
2.5	CPSC 4340	27,28,39,40				
2.6	CPSC 4317	28,30,38,39,40				
2.7	COSC 2372	27,31,35,40				
	COSC 4310	35,38,40				
3	COSC 2336 CPSC 4317 COSC 4310	37,38,40 37,38,40 35,37,38,40	3,4,6,7		3,4,6,7	
4	COSC 1172 COSC 3325 CPSC 4360	41 41 41	5,9		5,9	
5	COSC 3325	36	9	16	9	
6	COSC 4302 CPSC 4340 CPSC 4360	25,26,34,35 25,26,34,35 25,26,34	4,7,8,11,13,14		4,7,8,11,13,14	
7	COSC 3325 CPSC 4360	34,42 25,26,34	8,13,14	13	8,13,14	
8	COSC 1172 COSC 3325 COSC 4302 CPSC 4360	34 42 26,34 26,34	8,13,14	12	8,13,14	
9	COSC 3325 COSC 4272	42 27,34,35,40,42	1,10,11	9,11	1,10,11	Overall Average Score

Note: An Exit Survey that is anonymous is also given to students in COSC 4272 (Senior Seminar). It is concerned mainly with overall program issues such as scheduling, cognate courses, advising, and satisfaction with opportunities for independent study.

Criteria for Satisfactory Performance

On Course Student Evaluations: average for each course/semester >= 3.75
On Exit Interview Form: average for each question/year >= 3.75
On Exit Interview Form: average for each of the overall quality questions/year >= 7.5/year
On Exit Survey Form: questions 1-18 >= 3.75/year except for question 3 where the goal is between 2.25 and 4.00/year.
On Alumni Survey: average on each curriculum question >= 4.0
On Alumni Survey: average for each of the overall quality questions/year >= 8.0
ETS questions: Mean on each assessment indicator each semester >= 50.0; overall average/semester >= 160 with minimum >= 140.

Other Sources of Indirect Data

1. Input from our Industrial Advisory Board

Criteria Used to Evaluate Indirect Data

If average score >= our target criteria, then performance criteria is met
Else if 5 <= sample size < 10, then monitor performance criteria for next two semesters
Else if sample size < 5, then the curriculum remains the same, but we will gather data for the next two cycles to produce a larger sample for analysis.
Else criteria is not met.

Appendix F – Indirect Measure Assessment Instruments 2023-2024

This appendix includes assessment instruments used for indirect measures. Please note that alumni surveys are only solicited every 2 years. The following instruments are included:

1. Student Evaluations
2. Exit Interview
3. Exit Survey
4. Alumni Survey

F.1 - Form for Student Evaluations

	Undergraduate Online Course Assessment Form Course Name: _____ _____	Major_____ Date_____ Course Number _____				
Question Number (University Online Evaluation Question Number:)	**Student Assessment of Program Outcomes** Note: Not all of the topics listed below are covered in any class. Hence, it does not make sense for all of your answers to be the same. It is perfectly reasonable that some of your answers should be "strongly disagree." **This course provided you**	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1 (25)	the opportunity to work effectively as a member of a software development team.	1	2	3	4	5
2 (26)	the knowledge to employ effective teamwork and interpersonal communication skills.	1	2	3	4	5
3 (27)	the knowledge to analyze a software development problem and design a software solution.	1	2	3	4	5
4 (28)	the ability to implement a software design specification in an appropriate development environment.	1	2	3	4	5
5 (29)	the ability to apply appropriate user interface design.	1	2	3	4	5
6 (30)	the knowledge to design and apply relevant software testing procedures.	1	2	3	4	5
7 (31)	instruction on the proper documentation of source code.	1	2	3	4	5
8 (32)	the knowledge needed to develop user-level documentation for software.	1	2	3	4	5
9 (33)	the ability to independently acquire new computing related skills (e.g. new computing environment, new programming language).	1	2	3	4	5
10 (34)	the ability to communicate technical design and implementation concepts to computing professionals as well as to non-computing personnel, both orally and in writing.	1	2	3	4	5
11 (35)	the knowledge to evaluate hardware and software in the context of integrating computing into an environment or defining a computing solution to a particular problem or situation.	1	2	3	4	5
12 (36)	the knowledge to conduct yourself in an ethical and professional manner and to assume a leadership role in class projects.	1	2	3	4	5
13 (37)	the ability to apply knowledge from computer science and other disciplines to solve computer science problems.	1	2	3	4	5
14 (38)	the knowledge to design and conduct simulation or other computer experiments and analyze and interpret data.	1	2	3	4	5
15 (39)	with a firm theoretical foundation for the subject of the course.	1	2	3	4	5
16 (40)	the knowledge to acquire the required skills in the use of the tools and technology of computer science.	1	2	3	4	5
17 (41)	the ability to obtain and use information about the local					

	and global impact of the field on relevant societal issues.	1	2	3	4	5
18 (42)	with motivation to establish habits of life-long learning and curiosity.	1	2	3	4	5
	Student Assessment of Instruction	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
19	Instructor seemed to have a thorough understanding of subject matter.	1	2	3	4	5
20	Instructor was able to answer student questions effectively.	1	2	3	4	5
21	Instructor made contributions not in assigned material.	1	2	3	4	5
22	Instructor treats all students equally.	1	2	3	4	5
23	Instructor had a reasonable grading system.	1	2	3	4	5
24	Instructor made grading system clear to student.	1	2	3	4	5
25	Instructor was available to students online.	1	2	3	4	5
26	Instructor gave tests that adequately evaluated the understanding of the course material.	1	2	3	4	5
27	Instructor made reasonable assignments.	1	2	3	4	5
28	Instructor returned tests and papers in a reasonable time.	1	2	3	4	5
29	Instructor made the course interesting.	1	2	3	4	5
31	Instructor was able to present concepts so they were understood.	1	2	3	4	5
32	Instructor presented lectures that were carefully planned and were helpful.	1	2	3	4	5
33	Taking this instructor's course was worthwhile.	1	2	3	4	5
	Student Information					
34	What grade did you expect to receive in this course?	F	D	C	B	A
35	What is your grade range in this course?	DF	CD	BC	AB	
36	What is the average number of hours per week you spent on this course?	<2	2 to 7	7 to 12	>12	
37	If you dropped or do not pass this course, would you consider taking the course from the same instructor again?	No	Yes			
38	Would you recommend the instructor to a friend who is considering taking this course?	No	Yes			
39	Please assign an overall rating to the instructor based on a scale from A (excellent) to E (very poor).	F	D	C	B	A
	Comments Section					
	Number of Tests given?					
	Number of assignments assigned?					

F.2 - Form for Exit Interview

Department of Computer Science
Exit Interview Form
UNDERGRADUATE

Please print clearly.

Date: _____

Name: _____

_____

Permanent Address: _____

_____ _____ _____
City State Zip

Check your degree program: ☐ B.S. in Computer Science ☐ B.S. in Computer Information Science

If you took the SAT test in high school, what was your total score: _____

What was the most important reason for your coming to Lamar University rather than another university?

_____

_____

_____

Check: I ☐ have ☐ have not found a position yet.

If you have found a position, what is the name of the company, and where is the company located?

_____

_____

_____

If you have found a position, what is your job title? _____

If you have found a position, what is the starting salary of your new position? _____

On the average, how many hours per week have you been employed during the time when you were enrolled in courses during the last two years before graduation? _____

From what high school did you graduate? _____

What year? _____

If outside the local area, what was the city and state? _____

How many years have passed since the time you first enrolled at Lamar and the time when you will be graduating? _____

Exit Interview Questions

Questions concerning the Quality of the Program in the Computer Science Department.

_____ 1. On a scale of one to ten (with 10 being good), how do you rate the quality of the courses taken within the department?

_____ 2. On a scale of one to ten, how do you rate the quality of instruction in computer science courses?

_____ 3. On a scale of one to ten (with 10 being easy and 1 being hard), how do you rate the ease of scheduling courses in computer science?

_____ 4. On a scale of one to ten (with 10 being very satisfied and 1 being not satisfied at all), how do you rate your overall satisfaction with the program you are graduating in?

Department of Computer Science Objectives		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1.	Your education required you to apply critical thinking to solving difficult problems.	1	2	3	4	5
2.	Your education ensured that you can design software solutions to different types of problems.	1	2	3	4	5
3.	Your education provided a firm theoretical foundation so that you were prepared for future scientific advances.	1	2	3	4	5
4.	Your education stimulated an understanding of the role of computer science in interdisciplinary studies, and it increased your interest and abilities in other areas.	1	2	3	4	5
5.	Your education fostered an understanding of the impact of the discipline on relevant local and global social issues.	1	2	3	4	5
6.	Your education enabled you to develop the ability to analyze and solve computer science problems by applying knowledge from computer science, mathematics, and software engineering.	1	2	3	4	5
7.	Your education offered the preparation necessary to design and conduct simulations or other experiments and analyze and interpret data.	1	2	3	4	5
8.	Your education during the entire Computer Science program developed your skills in communication and cooperation within workgroups.	1	2	3	4	5
9.	Your education fostered an awareness of professional and ethical responsibilities and their application in real situations.	1	2	3	4	5
10.	Your education established an understanding of the need for life-long education and curiosity.	1	2	3	4	5
11.	Your education in the CS Department occurred in an environment that facilitated and encouraged	1	2	3	4	5

	learning.					
12.	Your education enabled you to understand the process of software development including specifications, analysis, design, and testing.	1	2	3	4	5
13.	Your education provided a sufficient educational foundation for leadership roles along future career paths.	1	2	3	4	5
14.	Your education gave you the ability to recognize and value diversity in the world and in intellectual areas.	1	2	3	4	5
15.	Your education gave you a strong background in the fundamental technical areas of computer architecture, algorithms, operating systems, database systems, and formal languages.	1	2	3	4	5

Please give your opinion concerning the strengths of your degree program?

Please give suggestions for improvement to your degree program?

Questions Concerning Your Experiences at Lamar.

Have you received any awards from the Department, College or University since you have been at Lamar? If you have, please list them.

Have you used the services of the Career Center since coming to Lamar? ☐ Yes ☐ No

If you have, what help did the Career Center provide?

How many group projects do you think you did in computer science courses? _____

How many presentations did you make in computer science courses? _____

Did you present any course projects outside the classroom at:

Regional Student Conference	☐ Yes	☐ No
Civic Group (i.e. Chamber of Commerce	☐ Yes	☐ No
Professional Conference sponsored by the ACM or IEEE	☐ Yes	☐ No

Other: _____

Did you participate regularly in ACM? ☐ Yes ☐ No

What factors caused you to participate or not participate regularly in ACM?

Did you participate in UPE? ☐ Yes ☐ No

Did you receive any scholarships? ☐ Yes ☐ No If so, what were the sources of the funds?

If you received any scholarships, what was the total amount you received over the course of time you studied at Lamar? _____

If you received any scholarships, did the money you receive determine your decision to come to Lamar and study Computer Science? ☐ Yes ☐ No

What were your favorite CS/CIS/ELEN courses? _____

_____

Reasons for selections? _____

_____

What were your least favorite CS/CIS/ELEN courses? _____

_____

Reasons for selections? _____

_____

Who were your favorite CS/CIS/ELEN instructors? _____

_____

Reasons for selections? _____

_____

Who were your least favorite CS/CIS/ELEN instructors? _____

_____

Reasons for selections? _____

_____

What were your favorite Math and/or Physics courses? _____

_____

Reasons for selections? _____

What were your least favorite Math and/or Physics courses?

Reasons for selections?

F.3 - Form for Exit Survey

Computing Sciences Department Exit Survey
2023-2024 Academic Year

The following information is being collected as part of our on-going self-evaluation. This survey is designed for graduating Computer Science and Computer Information Systems majors for the purpose of obtaining feedback from students with the goal of improving our courses and degree programs. Your responses to this survey will remain anonymous. Results will be analyzed and reported in terms of group statistics and collected comments. Do ***not*** place your name on the form.

Major:
Computer Information Systems [ ] Computer Science [ ]

Approximate overall GPA: ____ Approximate GPA in major: ____

For each statement that follows, please indicate your level of agreement. Space is provided for your comments that explain or clarify your answer. Use backs of sheets to continue comments (label by question number). While we are principally interested in the courses in the major and cognate, you may add comments on other courses at the university if you wish but please make clear to which courses you are referring.

---

1. I have learned a great deal in my major.

[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

2. I am well prepared for employment in my major.

[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

3. The work required for my major was

[ ] Too Easy Easy [ ] Reasonable Difficult Too Difficult
Comment:

4. Faculty are readily available for assistance on course work.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

5. The quality of teaching in the major is good.

[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment: (name courses)

6. The computer labs that support the program are satisfactory for that purpose.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

7. Departmental academic advisors were readily available for help and met my needs.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

8. Scheduling is easy because of the availability of courses.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

9. Independent study or research opportunities are satisfactory.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

10. Classrooms are adequate to support the program.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

11. I can analyze, design and implement a computerized solution to a "real life" problem.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment: (name courses)

12. I can write technical documents such as specifications, design and users' manuals in a specified format.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment: (name courses)

13. I can orally present a computerized project.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment: (name courses)

14. I am prepared to enter an appropriate graduate program.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

15. I have a good general background in Computer Science.
[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment: (name courses)

16. I am cognizant of ethical issues and local and global societal concerns relating to computers in society.

[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment:

17. My math and science courses provided a good background/supplement to my major.

[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment: (name courses)

18. My math and science courses were well taught.

[ ]Strongly Disagree [ ] Disagree [ ] Not Sure [ ] Agree [ ] Strongly Agree
Comment: (name courses)

19. What did you like best about the major?

20. What did you like least about the major?

21. What would you recommend to improve the advising system?

F.4 - Form for Alumni Survey

Computer Science Department
Alumni Survey

1. Name_____ Date_____
(If female, please provide maiden name in addition to married name)

What degree(s) did you earn in the Computer Science Department at Lamar University?_____

Please give at least one address through which we might best be able to reach you in the future. For unmarried students, this will probably be the address of your parent(s) or guardian.

Permanent Home Address: _____
_____
_____

Present Address: _____
_____
_____

Phone Number: _____ Email Address: _____

Year of Graduation: _____

Degree(s) Received from Lamar:
- ¡ B.S. in Computer Science
- ¡ B.S. in Computer and Information Sciences
- ¡ M.S. in Computer Science

2. If you are employed, please provide the following:
Name of your company: _____

Your title: _____

Address of Employer: _____
_____
_____
_____

Salary: ˚ Less than $40,000 100,000$ - 80,000$ ˚
60,000$ - 40,000$ ˚ 200,000$ - 100,000$ ˚
80,000$ - 60,000$ ˚ ˚ More than $200,000

3. I rate the quality of the courses taken in the CS department as:

Poor										Excellent
0	1	2	3	4	5	6	7	8	9	10

4. I rate the quality of instruction in the program as:

Poor										Excellent
0	1	2	3	4	5	6	7	8	9	10

5. Scheduling of needed courses was:

Very Difficult					Reasonable					Easy
0	1	2	3	4	5	6	7	8	9	10

6. Overall I am satisfied with the program:

Not at All					Somewhat					Very
0	1	2	3	4	5	6	7	8	9	10

7. Department of Computer Science Objectives

		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1.	Your education required you to apply critical thinking to solving difficult problems.	1	2	3	4	5
2.	Your education ensured that you can design software solutions to a wide range of problems.	1	2	3	4	5
3.	Your education provided a firm theoretical foundation so that you were prepared for future scientific advances.	1	2	3	4	5
4.	Your education stimulated an understanding of the role of computer science in interdisciplinary studies, and it increased your interest and abilities in other areas.	1	2	3	4	5
5.	Your education fostered an understanding the impact of the discipline on relevant social issues.	1	2	3	4	5
6.	Your education enabled you to develop the ability to analyze and solve computer science problems by applying knowledge from computer science, mathematics, and software engineering.	1	2	3	4	5
7.	Your education offered the preparation necessary to design and conduct simulations or other experiments and analyze and interpret data.	1	2	3	4	5
8.	Your education developed in you skill in communication and cooperation within workgroups and larger organizations	1	2	3	4	5
9.	Your education fostered an awareness of professional and ethical responsibilities and their application in real situations.					

		1	2	3	4	5
10.	Your education established an understanding of the need for life-long education and curiosity.	1	2	3	4	5
11.	Your education in the CS department occurred in an environment that facilitated and encouraged learning.	1	2	3	4	5
12.	Your education enabled you to understand the process of software development including specifications, analysis, design, and testing.	1	2	3	4	5
13.	Your education provided a sufficient educational foundation for leadership roles along future career paths.	1	2	3	4	5
14.	Your education gave you the ability to recognize and value diversity in the world and in intellectual areas.	1	2	3	4	5
15	Your education has prepared you, in your opinion, for graduate study in Computer Science	1	2	3	4	5
16	You have a deep understanding of one or more sub-areas of Computer Science.	1	2	3	4	5
17	Your education gave you a strong background in the fundamental technical areas of computer architecture, algorithms, operating systems, database systems, and formal languages.	1	2	3	4	5

Please comment on what you think are the strengths of the CS program:

_____

_____

_____

_____

During your job interviews, did the interviewers offer any comments that suggested areas where they felt our degree was especially weak of especially strong? Were there topics they asked you about with which you were unfamiliar?

_____

_____

_____

_____

10. In what ACM/IEEE activities did you participate? _____

_____

_____

11. Age at graduation? _____ Married? _____ Gender? _____ Ethnicity?_____

12. How many children do you have? _____

13. Were you a transfer student? _____
If so, how many hours transferred toward the degree? _____

14. Were you a co-op or intern student? _____ How many semesters? _____

Company Name: _____

Address: _____

_____

_____

_____

15. Have you gone to graduate school after leaving Lamar? _____

If yes, what school(s) did you attend and what degree(s) did you earn?

_____

_____

_____

Please Return Completed Form to:

Computer Science Department
Lamar University
P.O. Box 10056
Beaumont, TX 77710

Appendix G – Assessment Results & Analysis 2023-2024

This appendix includes results and analysis of assessment for the 2023-2024 academic year (which includes the fall 2023 and spring 2024 long semesters). The following are included:

1. Direct Measure Results and Assessment Analysis 2023-2024
2. Direct Measure Results Summary: Student Learning Outcomes 2023-2024
3. Indirect Measure: Student Evaluation Summary 2023-2024
4. Indirect Measure: Exit Interview Summary 2023-2024
5. Indirect Measure: Exit Survey Summary 2023-2024
6. Indirect Measure: Alumni Survey Summary 2023-2024
7. Indirect Measure: Advisory Board Feedback 2023-2024
8. ETS Exams 2023-2024

G.1 – Direct Measure Results and Assessment Analysis 2023-2024

Department of Computer Science, Lamar University

Using the feedback from the indirect measures specified in Appendices E.1 and the results from our direct measures, the analysis of our assessment findings, actions taken, and recommendations for improvement are presented in this document. Note that the selected questions used on final examinations for each performance criterion are submitted by the faculty and approved by the departmental Assessment Committee to ensure adequate appropriate depth and consistency of content across time.

Assessment and Evaluation

Student Outcome 1 Software Fundamentals

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[1.1] Apply UML interaction diagrams and class diagrams to illustrate object models.	COSC 1336, COSC 1337, COSC 2336, CPSC 4360	Selected Questions on Final Exam	CPSC 4360	Spring and Fall of each year	Dr. Stefan Andrei	Size = 73 Percentage = 95 The target of 80% was Met
[1.2] Apply important design patterns to OOD.	COSC 3308, CPSC 4360	Selected Questions on Final Exam	CPSC4360	Spring and Fall of each year	Dr. Stefan Andrei	Size = 73 Percentage = 93 The target of 80% was Met
[1.3] Create useful software architecture documentation.	COSC 2336, COSC 3304, CPSC 4317, CPSC 4302, CPSC 4340 CPSC 4360	Rubric on software architecture documentation on final project	CPSC 4340	Fall of each year	Dr. Kami Makki	Size = 31 Percentage = 100 The target of 80% was Met
[1.4] Develop correct and efficient programs.	COSC 1336, COSC 1337, COSC 2336,	Selected Questions on Assignments	COSC 3304	Spring of each year	Dr. T. Roden	Size = 103 Percentage = 84.11

	COSC 3304, CPSC 4317, *CPSC 4302, *CPSC 4340 *CPSC 4360					The target of 80% was Met
[1.5] Debug implemented software in a proficient manner.	COSC 1336, COSC 1337, COSC 2336 COSC 2372	Selected Questions on Assignments	COSC 2336 and COSC 2372	Spring of each year	Dr. T. Roden	Size = 99 Percentage = 83.26 The target of 80% was Met
[1.6] Design user interfaces appropriate to a large software system	COSC 1336 COSC 1337 CPSC 4317 CPSC 4360	Rubric	CPSC 4360	Fall and Spring of Each year	Dr. Stefan Andrei	Size = 73 Percentage = 90.06 The target of 80% was Met
[1.7] Develop user-level documentation for software	All courses with programming assignments	Rubric	CPSC 4360 and COSC 2336	Fall and Spring each year	Dr. Stefan Andrei, Dr. Makki	Size = 157 Percentage = 90.75 The target of 80% was Met

* Courses contain material relevant to the performance criteria but are not used in the assessment strategy at this time.

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None
Second Cycle Results: None

Student Outcome 2.1 <u>Computer Science Technology Skills – Discrete Mathematics and Structures</u>

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.1.1] Be able to develop software to support specific operations on frequently used discrete structures such as lists, trees, and graphs.	COSC 2336, COSC 4302, CPSC 4317	Code development on final exams	COSC 2336	Fall and Spring of each year	Dr. Kami Makki and Dr. Zhang	Size = 97 Percentage = 89.77 The target of 80% was Met
[2.1.2] Be able to use elementary concepts of combinatorics, probability, and statistics to analyze and evaluate the efficiency of algorithms.	COSC 3304	Selected Questions on Midterm Exam in COSC 3304	COSC 3304	Spring of each year	Dr. Zhang	Size = 60 Percentage = 75 The target of 80% was **Not Met**
[2.1.3] Be able to use concepts of discrete mathematics, automata, and finite state machines to explain the design of computer hardware.	COSC 2336, COSC 2372, COSC 3302	Selected Questions on Final Exam in COSC 3302	COSC 3302	Spring of each year	Dr. Zhang	Size = 63 Percentage = 85 The target of 80% was Met

Date: August 1, 2024

Results: Criteria 2.1.2 was very close to meeting the target, so no actions were deemed necessary this year. We will monitor next year.

Actions: None.

Second Cycle Results: None.

Student Outcome 2.2 <u>Computer Technology Skills – Analysis and Design of Algorithms</u>

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.2.1] Demonstrate basic understanding of asymptotic notations and time complexity.	COSC 2336 COSC 3304	Questions from Midterm Exam	COSC 3304	Spring each year	Dr. Makki	Size = 60 Percentage = 81 The target of 80% was Met
[2.2.2] Design efficient algorithms and compare competing designs.	COSC 2336 COSC 3304 CPSC 4360	Questions from Midterm Exam	COSC 3304	Spring each year	Dr. Makki	Size = 60 Percentage = 80 The target of 80% was Met
[2.2.3] Demonstrate basic understanding of some design approaches such as greedy algorithms, dynamic programming and divide-and-conquer.	COSC 2336 COSC 3304	Questions from Midterm Exam	COSC 3304	Spring each year	Dr. Makki	Size = 60 Percentage = 83 The target of 80% was Met
[2.2.4] Demonstrate familiarity with standard searching and sorting algorithms and linear and non-linear structures.	COSC 2336 COSC 3304	Questions from Midterm Exam	COSC 3304	Spring each year	Dr. Makki	Size = 60 Percentage = 80 The target of 80% was

						Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results:

Student Outcome 2.3 <u>Computer Science Technology Skills – Formal Languages and Computability Theory</u>

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.3.1] Demonstrate basic knowledge of equivalences between various types of languages and corresponding accepting devices including Turing Machines.	COSC 3302	Exam questions	COSC 3302	Spring Semester	Dr. Andrei	Size = 65 Percentage = 85 The target of 80% was Met
[2.3.2] Demonstrate basic knowledge of practical applicability of various types of grammar and of some standard representation forms.	COSC 3302	Exam questions	COSC 3302	Spring Semester	Dr. Andrei	Size = 65 Percentage = 76 The target of 80% was **Not Met**
[2.3.3] Demonstrate knowledge of limitations of computational capability of computer grammars.	COSC 3308 COSC 3302	Exam questions	COSC 3302	Spring Semester	Dr. Andrei	Size = 65 Percentage = 78 The target of 80% was **Not Met**
[2.3.4] Demonstrate basic knowledge of equivalences and normal forms of logical formulas in propositional logic.	COSC 3308 COSC 3302 COSC 2375	Exam questions	COSC 3302	Spring Semester	Dr. Andrei	Size = 65 Percentage = 83 The target of 80% was Met
[2.3.5] Demonstrate basic	COSC 3308	Exam	COSC 3308	Fall Semester	Dr. Andrei	Size = 49

understanding and appreciation of the various essential programming languages constructs, paradigms, evaluation criteria, and language implementation issues.		questions				Percentage = 92 The target of 89% was Met
[2.3.6] Demonstrate basic knowledge and skills in programming techniques with the focus on concepts and not on a particular language.	COSC 3308	Exam questions	COSC 3308	Fall Semester	Dr. Andrei	Size = 49 Percentage = 82 The target of 80% was Met

Date: August 1, 2024

Results: Two criteria were very close to meeting the targets, less than 5% each, so no actions were deemed necessary this year. We will monitor next year.

Actions: None

Second Cycle Results: None

Student Outcome 2.4 <u>Computer Science Technology Skills – Operating Systems</u>

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.4.1] Knows the main components of an operating system and their purposes and modes of interaction.	COSC 4302	Exam Questions	COSC 4302	Fall and Spring Semesters	Dr. Bo Sun	Size = 45 Percentage = 84.55 The target of 80% was Met
[2.4.2] Knows the structure of device drivers and the interaction between device drivers and operating systems.	COSC 4302	Exam Questions	COSC 4302	Fall and Spring Semesters	Dr. Bo Sun	Size = 45 Percentage = 84.55 The target of 80% was Met
[2.4.3] Outlines the basic issues in memory management design and virtual memory	COSC 4302	Exam Questions	COSC 4302	Fall and Spring Semesters	Dr. Bo Sun	Size = 45 Percentage = 84.55 The target of 80% was Met
[2.4.4] Can develop basic system applications based on operating system APIs.	COSC 4302 CPSC 4317	Exam Questions	COSC 4302	Fall and Spring Semesters	Dr. Bo Sun	Size = 45 Percentage = 84.55 The target of 80% was Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results: None

Student Outcome 2.5 <u>Computer Science Technology Skills – Database Design</u>

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.5.1] Demonstrate the application of Entity-Relational diagrams to model real world problems.	CPSC 4340	Exam Questions	CPSC 4340	Fall Semester	Dr. Kami Makki	Size = 31 Percentage = 83 The target of 80% was Met
[2.5.2] Design relations for real world problems including implementation of normal forms, keys, and semantics constraints for each relation.	CPSC 4340 CPSC 4360	Exam Questions	CPSC 4340	Fall Semester	Dr. Kami Makki	Size = 31 Percentage = 79 The target of 80% was **Not Met**
[2.5.3] Demonstrate competence in implementations of database applications.	CPSC 4340	Rubric for final project	CPSC 4340	Fall Semester	Dr. Kami Makki	Size = 31 Percentage = 100 The target of 80% was Met

Date: August 1, 2024

Results: Criteria 2.5.2 was very close to meeting the target, by 1%, so no actions were deemed necessary this year. We will monitor next year.

Actions: None

Second Cycle Results: Last year we did not meet the target for criteria 2.5.1. This year that target was met. It appears our action plan last year was successful.

Student Outcome 2.6 <u>Computer Science Technology Skills – Computer Networks</u>

Indirect Assessment Methods:

Student Evaluation

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.6.1] Employ the socket API to program applications among independent hosts.	CPSC 4317	Exam Questions	CPSC 4317	Fall Semester	Dr. Bo Sun	Size = 25 Percentage = 84 The target of 80% was Met
[2.6.2] Explain common network architectures, the services provided by each layer, and the protocols required for connecting peer layers.	CPSC 4317	Exam Questions	CPSC 4317	Fall Semester	Dr. Bo Sun	Size = 25 Percentage = 84 The target of 80% was Met
[2.6.3] Evaluate network models through simulation and the use of common performance metrics for networks.	CPSC 4317	Project	CPSC 4317	Fall Semester	Dr. Bo Sun	Size = 25 Percentage = 84 The target of 80% was Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.
Actions: None
Second Cycle Results: None

Student Outcome 2.7 Computer Science Technology Skills –Computer Organization and Architecture

Indirect Assessment Methods:

Student Evaluation

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[2.7.1] Understands modern ISA design principles and employs them to evaluate systems	COSC 2372, COSC 4310	Local Exam Question	COSC 4310	Spring and Fall semesters	Dr. Jiangjiang Liu	Size = 62 Percentage = 74 The target of 80% was **Not Met**
[2.7.2] Know how to measure performance for different computer architectures	COSC 4310	Local Exam Question	COSC 4310	Spring and Fall semesters	Dr. Jiangjiang Liu	Size = 62 Percentage = 80 The target of 80% was Met
[2.7.3] Demonstrate knowledge of hardware implementation of numbers and arithmetic operations	COSC 2372, COSC 4310	Local Exam Question	COSC 4310	Spring and Fall semesters	Dr. Jiangjiang Liu	Size = 62 Percentage = 80 The target of 80% was Met

Date: August 1, 2024

Results: Criteria 2.6.1 was very close to meeting the target, by 6%. We will discuss the results with the instructor in order to enable the instructor to put an action plan into place for course revisions as needed.

Actions: None

Second Cycle Results: Last year we did not meet the targets for criteria 2.6.2 and 2.6.3. This year those targets was met. It appears our action plan last year was successful.

Student Outcome 3 Scientific Method**

**Graduates will be able to gather requirements, analyze, design and conduct simulations or other computer experiments in order to evaluate and interpret the data.

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[3.1] Be able to justify why selected research methods were chosen and state the intended outcomes of the study.	COSC 2336, CPSC 4317, COSC 4310	Rubric and Project	CPSC 4317 and COSC 4310	Spring and Fall of every year	Dr. Jiangjiang Liu and Dr. Bo Sun	Size = 122 Percentage = 92.23 The target of 80% was Met
[3.2] Identify steps used in a particular study.	COSC 2336, CPSC 4317, COSC 4310	Rubric and Project	CPSC 4317 and COSC 4310	Spring and Fall of every year	Dr. Jiangjiang Liu and Dr. Bo Sun	Size = 122 Percentage = 92.23 The target of 80% was Met
[3.3] Be able to outline and explain the key features of the adopted method.	COSC 2336, CPSC 4317, COSC 4310	Rubric and Project	CPSC 4317 and COSC 4310	Spring and Fall of every year	Dr. Jiangjiang Liu and Dr. Bo Sun	Size = 122 Percentage = 92.23 The target of

						80% was Met
[3.4] Analyze and interpret collected data based on the adopted method and draw appropriate conclusions.	COSC 2336, CPSC 4317, COSC 4310	Rubric and Project	CPSC 4317 and COSC 4310	Spring and Fall of every year	Dr. Jiangjiang Liu and Dr. Bo Sun	Size = 122 Percentage = 88.99 The target of 80% was Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results: None.

Student Outcome 4 <u>Societal Awareness</u>**

**Graduates will be aware of and understand the impact of computer technology on society at large, on the workplace environment, and on individuals.

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[4.1] Demonstrate understanding of evolving computer technology applications.	COSC 1172, COSC 3325	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = 56 Percentage = 100 The target of 80% was Met
[4.2] Demonstrate knowledge of positive social impacts including information globalization, E-Commerce, E-learning and new job creation.	COSC 1172, COSC 3325, CPSC 4340, CPSC 4317	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = 56 Percentage = 100 The target of 80% was Met
[4.3] Demonstrate knowledge of negative social impacts including internet pornography, privacy violation, health hazards, computer crimes and dehumanization.	COSC 1172, COSC 3325, CPSC 4340, CPSC 4317,	Exam Questions	COSC 3325, CPSC 4317	Fall and Spring each year	Dr. Stefan Andrei, Dr. Bo Sun	Size = 56 Percentage = 100 The target of 80% was Met
[4.4] Demonstrate basic understanding of intellectual property protection via copyright and patent law and fair use exception for copyrighted software.	COSC 1172, COSC 3325, CPSC 4340, CPSC 4360	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = 103 Percentage = 94.98 The target of 80% was Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results: None.

Student Outcome 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.

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[5.1] Know the differences of various philosophical views on ethics such as deontology, utilitarianism, egoism, and relativism.	COSC 3325	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = 56 Percentage = 100 The target of 80% was Met
[5.2] Understand the ACM or a similar professional body's code of ethics and principles underlying those ethics.	COSC 3325, CPSC 4360	Exam Questions	CPSC 4360	Fall Spring each year	Dr. Stefan Andrei	Size = 26 Percentage = 92 The target of 80% was Met
[5.3] Honor the property rights of others including copyrights and patents.	COSC 1172, COSC 3325, CPSC 4360	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = 56 Percentage = 100 The target of 80% was Met
[5.4] Demonstrate ability for ethical decision making within the computer profession.	COSC 1172, COSC 3325, CPSC 4317, CPSC 4360	Exam Questions	COSC 3325	Spring each year	Dr. Stefan Andrei	Size = 56 Percentage = 100 The target of 80% was Met
[5.5] Demonstrate knowledge of	COSC 1172,	Exam	COSC 3325	Spring each	Dr. Stefan	Size = 56

factors affecting fair resolution of conflicts of interests.	COSC 3325, CPSC 4360	Questions		year	Andrei	Percentage = 100 The target of 80% was Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results: None.

Student Outcome 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.

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[6.1] Demonstrate the ability to work in heterogeneous environments which are diverse in gender, ethnicity, and academic accomplishment.	CPSC 4360, CPSC 4340, COSC 4302	Rubrics	CPSC 4340, CPSC 4360	Fall and Spring Semesters	Dr. Andrei, Dr. Kami Makki	Size = 104 Percentage = 93.02 The target of 80% was Met
[6.2] Attend team meetings and contribute towards solution of technical problems during the meetings.	CPSC 4360, CPSC 4340, COSC 4302	Rubrics	CPSC 4340, CPSC 4360	Fall and Spring Semesters	Dr. Andrei, Dr. Kami Makki	Size = 104 Percentage = 90.02 The target of 80% was Met
[6.3] Make appropriate contributions within their skill set to the completion of the project.	CPSC 4360, CPSC 4340, COSC 4302	Rubrics	CPSC 4340, CPSC 4360	Fall and Spring Semesters	Dr. Andrei, Dr. Kami Makki, Dr. Doerschuk	Size = 104 Percentage 97.39he target of 80% was Met
[6.4] Demonstrate a sense of interdependence with	CPSC 4360, CPSC 4340, COSC 4302	Rubrics	CPSC 4340, CPSC 4360	Fall and Spring Semesters	Dr. Andrei, Dr. Kami Makki	Size = 104 Percentage = 97.39

other team members.						The target of 80% was Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results: None

Student Outcome 7 <u>Oral Communications</u>**

**Graduates will demonstrate their ability to verbally communicate clearly.

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[7.1] Demonstrate the ability to communicate in a given situation.	COSC 3325, COSC 4272, COSC 1172	Rubrics	COSC 3325, COSC 4272	Fall and Spring Semesters	Dr. Stefan Andrei	Size = 89 Percentage = 100 The target of 80% was Met
[7.2] Demonstrate the ability to comprehend what is said and to show an appreciation of the importance of listening.	COSC 3325, COSC 4272, COSC 1172	Rubrics	COSC 3325, COSC 4272	Fall and Spring Semesters	Dr. Stefan Andrei	Size = 89 Percentage = 100 The target of 80% was Met
[7.3] Communicate clearly at the level of the audience the technical material intrinsic to the discipline of computer science.	COSC 3325, COSC 4272, COSC 1172	Rubrics	COSC 3325, COSC 4272	Fall and Spring Semesters	Dr. Stefan Andrei	Size = 89 Percentage = 100 The target of 80% was Met
[7.4] Demonstrate knowledge of the	COSC 3325, COSC 4272,	Rubrics	COSC 3325, COSC 4272	Fall and Spring Semesters	Dr. Stefan Andrei	Size = 89 Percentage =

communication process.	COSC 1172		CPSC 4360			100 The target of 80% was Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results: None

Student Outcome 8 Written Communication Skills**

**Graduates will demonstrate their ability to write effectively both technical and non-technical materials with appropriate multimedia aids.

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[8.1] Provide an introduction that grabs the attention of readers.	COSC 1172, COSC 3325, COSC 4272, CPSC 4360, COSC 4302	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = 118 Percentage = 89.7 The target of 80% was Met
[8.2] Organize documents in terms of a few main points or themes.	COSC 1172, COSC 3325, COSC 4272, CPSC 4360, COSC 4302	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = 118 Percentage = 89.7 The target of 80% was Met
[8.3] Choose	COSC	Rubrics	CPSC 4360,	Fall and Spring	Dr. Sun, Dr.	Size = 118

appropriate illustrations, examples, or evidence to support the written documents.	1172, COSC 3325, COSC 4272, CPSC 4360, COSC 4302		COSC 4302	Semesters	Andrei	Percentage = 89.7 The target of 80% was Met
[8.4] Write appropriately for specified readers in terms of technical content.	COSC 1172, COSC 3325, COSC 4272, CPSC 4360, COSC 4302	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = 118 Percentage = 89.7 The target of 80% was Met
[8.5] Write organized, grammatically correct reports.	COSC 1172, COSC 3325, COSC 4272, CPSC 4360, COSC 4302	Rubrics	CPSC 4360, COSC 4302	Fall and Spring Semesters	Dr. Sun, Dr. Andrei	Size = 118 Percentage = 89.7 The target of 80% was Met

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results: None

Student Outcome 9 <u>Continuing Education and Lifelong Learning</u>**

**Graduates will be demonstrate that they can independently acquire new computing related skills and knowledge in order to pursue either further formal or informal learning after graduation.

Indirect Assessment Methods:

Student Evaluation, Exit Interview, Alumni Survey, ETS Scores

Performance Criteria	Strategies	Assessment Method(s)	Context for Assessment	Time of Data Collection	Assessment Coordinator	Analysis of Direct Results
[9.1] Be able to search scholarly publications to assist in resolving problems.	COSC 3325, COSC 4272, COSC 4302, CPSC 4360	Rubrics	COSC 3325 and COSC 4272	Fall and Spring	Dr. Andrei	Size = 89 Percentage = 100 The target of 80% was Met
[9.2] Intend to engage in additional formal education or participate in employer-related training or research projects.	COSC 4272	Rubrics	COSC 4272	Fall and Spring	Dr. Andrei	Size = 33 Percentage = 100 The target of 80% was Met.
[9.3] Independent study. Participate in Honors program or in undergraduate research at Lamar. This could be done in the STAIRSTEP Program, Presentations or Posters at Professional Conferences, COOP or Internship position reports. Student could own	COSC 4272	Rubrics	COSC 4272	Fall and Spring	Dr. Andrei	Size = 33 Percentage = 100 The target of 80% was Met.

a software design and development company.						

Date: August 1, 2024

Results: All criteria met their direct assessment targets.

Actions: None

Second Cycle Results: None.

G.2 - Direct Measure Results Summary: Student Learning Outcomes 2023-2024

Summary of Student Learning Outcome Results 2023-2024					
Student Outcome	Performance Criterion	2023-2024			Target >=80% out of students pass
		Sample Size	Sample Sections	Mean Scale [0%..100%]	
Outcome 1	1	73	2	95.00%	
	2	73	2	93.00%	
	3	31	1	100.00%	
	4	103	3	84.11%	
	5	99	2	83.26%	
	6	73	2	90.06%	
	7	157	4	90.75%	
Outcome 2.1	1	97	2	89.77%	
	2	60	1	75.00%	**Not Met**
	3	63	1	85.00%	
Outcome 2.2	1	60	1	81.00%	
	2	60	1	80.00%	
	3	60	1	83.00%	
	4	60	1	80.00%	
Outcome 2.3	1	65	1	85.00%	
	2	65	1	76.00%	**Not Met**
	3	65	1	78.00%	**Not Met**
	4	65	1	83.00%	
	5	49	1	92.00%	
	6	49	1	82.00%	
Outcome 2.4	1	45	2	84.55%	
	2	45	2	84.55%	
	3	45	2	84.55%	
	4	45	2	84.55%	
Outcome 2.5	1	31	1	83.00%	
	2	31	1	79.00%	**Not Met**
	3	31	1	100.00%	
Outcome 2.6	1	25	1	84.00%	
	2	25	1	84.00%	
	3	25	1	84.00%	
Outcome 2.7	1	62	1	74.00%	**Not Met**
	2	62	1	80.00%	
	3	62	1	80.00%	
Outcome 3	1	122	3	92.23%	
	2	122	3	92.23%	

	3	122	3	92.23%	
	4	122	3	88.99%	
Outcome 4	1	56	1	100.00%	
	2	56	1	100.00%	
	3	56	1	100.00%	
	4	103	2	94.98%	
Outcome 5	1	56	1	100.00%	
	2	26	1	92.00%	
	3	56	1	100.00%	
	4	56	1	100.00%	
	5	56	1	100.00%	
Outcome 6	1	104	3	93.02%	
	2	104	3	90.02%	
	3	104	3	97.39%	
	4	104	3	97.39%	
Outcome 7	1	89	3	100.00%	
	2	89	3	100.00%	
	3	89	3	100.00%	
	4	89	3	100.00%	
Outcome 8	1	118	4	89.70%	
	2	118	4	89.70%	
	3	118	4	89.70%	
	4	118	4	89.70%	
	5	118	4	89.70%	
Outcome 9	1	89	3	100.00%	
	2	33	2	100.00%	
	3	33	2	100.00%	

G.3 - Indirect Measure Results: Student Course and Instructor Evaluation Summary 2023-2024

Student Outcome	Course	Ques. (u#)*	Semester				Total Sample Size	Avg. [1..5]	>=3.75
			Fall		Spring				
			Sample Size	Mean [1..5]	Sample Size	Mean [1..5]			
Outcome 1	COSC 1336	27	37	3.80	6	3.67	43	3.78	
		28	38	3.78	6	3.83	44	3.78	
		29	38	3.73	6	4.00	44	3.76	
		31	37	4.02	6	4.00	43	4.01	
	COSC 1337	27	23	4.04	60	3.68	83	3.77	
		28	23	3.99	60	3.58	83	3.69	**Not Met**
		29	23	3.91	60	3.53	83	3.63	**Not Met**
		30	23	3.87	59	3.51	82	3.61	**Not Met**
		31	23	4.08	59	3.76	82	3.84	
	COSC 2336	27	50	3.94	38	4.08	88	4.00	
		28	50	4.00	38	3.92	88	3.96	
		30	50	3.88	38	3.79	88	3.88	
		31	50	4.06	38	3.97	88	4.02	
	COSC 3304	27			26	4.12	26	4.12	
		28			26	3.85	26	3.85	
		29			26	3.69	26	3.69	**Not Met**
		30			26	3.81	26	3.81	
		31			25	3.71	25	3.71	**Not Met**
		32			25	3.68	25	3.68	**Not Met**
	CPSC 4317	27			1	5.00	1	5.00	
		28			1	5.00	1	5.00	
		30			1	5.00	1	5.00	
	COSC 4272	27	6	3.83	8	4.13	14	4.00	

	COSC 4302	25	99	4.31	62	4.34	161	4.32	
		27	98	4.23	62	4.48	160	4.32	
		28	97	4.18	62	4.45	159	4.28	
		30	98	4.08	62	4.45	160	4.20	
		31	99	4.18	62	4.52	161	4.31	
	CPSC 4340	28			29	3.17	29	3.17	**Not Met**
		29			29	3.07	29	3.07	**Not Met**
		30			29	3.03	29	3.03	**Not Met**
		31			29	2.86	29	2.86	**Not Met**
	CPSC 4360	25	8	4.13	31	4.13	39	4.13	
		27	8	4.00	31	4.16	39	4.12	
		28	8	4.13	31	3.97	39	4.00	
		29	8	4.00	31	4.00	39	4.00	
		30	8	3.75	31	4.03	39	3.97	
		31	8	3.75	32	3.81	40	3.79	
Outcome 2.1	COSC 2336	27	50	3.94	38	4.08	88	4.00	
		28	50	4.00	38	3.92	88	3.96	
		29	50	3.80	38	3.66	88	3.73	**Not Met**
		31	50	4.06	38	3.97	88	4.02	
	COSC 3304	27			26	4.12	26	4.12	
		37			26	4.31	26	4.31	
		40			26	4.00	26	4.00	
	COSC 3302	27			53	3.21	53	3.21	**Not Met**
Outcome 2.2	COSC 3304	27			26	4.12	26	4.12	
		28			26	4.31	26	4.31	
		33			26	3.96	26	3.96	
		39			25	4.20	25	4.02	
		40			26	4.00	26	4.00	
Outcome 2.3	COSC 3302	39			53	3.40	53	3.40	**Not Met**
		40			53	3.40	53	3.40	**Not Met**
Outcome 2.4	COSC 4302	27	98	4.23	62	4.48	160	4.32	

		28	97	4.18	62	4.45	159	4.28	
		35	99	4.22	62	4.52	161	4.33	
		39	99	4.24	62	4.50	161	4.34	
		40	98	4.26	62	4.48	160	4.34	
Outcome 2.5	CPSC 4340	27			30	3.07	30	3.07	
		28			29	3.17	29	3.17	**Not Met**
		39			30	3.37	30	3.37	**Not Met**
		40			30	3.37	30	3.37	**Not Met**
Outcome 2.6	CPSC 4317	28			1	5.00	1	5.00	
		30			1	5.00	1	5.00	
		38			1	5.00	1	5.00	
		39			1	5.00	1	5.00	
		40			1	5.00	1	5.00	
Outcome 2.7	COSC 4310	35	47	3.60			47	3.60	**Not Met**
		38	47	3.49			47	3.49	**Not Met**
		40	47	3.68			47	3.68	**Not Met**
Outcome 3	CPSC 4317	37			1	5.00	1	5.00	
		38			1	5.00	1	5.00	
		40			1	5.00	1	5.00	
	COSC 4310	35	47	3.60			47	3.60	**Not Met**
		38	47	3.49			47	3.49	**Not Met**
		40	47	3.68			47	3.68	**Not Met**
Outcome 4	COSC 1172	41	29	3.83	6	3.83	35	3.83	
	CPSC 4360	41	8	3.88	31	3.65	39	3.69	**Not Met**
Outcome 5	COSC 3325	36			33	3.77	33	3.77	
Outcome 6	COSC 4302	25	98	4.31	62	4.34	161	4.32	
		26	99	4.24	62	4.39	161	4.29	
		34	99	4.16	62	4.48	161	4.28	
		35	99	4.22	62	4.52	161	4.33	

	CPSC 4340	25			29	2.83	29	2.83	**Not Met**
		26			30	2.73	30	2.73	**Not Met**
		34			30	3.07	30	3.07	**Not Met**
		35			29	3.10	29	3.10	**Not Met**
	CPSC 4360	25	8	4.13	31	4.13	39	4.13	
		26	8	3.88	31	4.13	39	4.07	
		34	8	3.50	31	4.00	39	3.89	
Outcome 7	CPSC 4360	25	8	4.13	31	4.13	39	4.13	
		26	8	3.88	3.88	4.13	39	4.07	
		34	8	3.50	31	4.00	39	3.89	
Outcome 8	COSC 1172	34	28	2.96	6	4.00	35	3.05	
	COSC 4302	26	99	4.24	62	4.39	161	4.29	
		34	99	4.16	62	4.48	161	4.28	
	CPSC 4360	26	8	3.88	31	4.13	39	4.07	
		34	8	3.50	31	4.00	39	3.89	
Outcome 9	COSC 4272	27	6	3.83	8	4.13	14	4.00	
		34	6	4.17	8	4.75	14	4.50	
		35	6	3.83	8	4.00	14	3.92	
		40	6	3.83	8	4.38	14	4.14	
		42	6	4.17	8	4.88	14	4.57	

G.4 - Indirect Measure Results: Exit Interview Summary 2023-2024

A. Program Quality. Each item is measured on a 10-point scale with a goal of a mean score of at least 7.5.

Question	Semester						
	Fall		Spring		Total Sample Size	Average	>=7.5
	Sample Size	Mean	Sample Size	Mean			
1	12	6.41	18	7.27	30	6.92	**Not Met**
2	12	6.83	18	7.44	30	7.19	**Not Met**
3	12	5.83	18	6.94	30	6.49	**Not Met**
4	12	6.75	18	7.55	30	7.23	**Not Met**

B. Department Student Outcomes. Each item is measured on a 5-point scale with a goal of a mean score of 3.75.

Student Outcome	Question	Semester				Total Sample Size	Average [1..5]	>=3.75
		Fall		Spring				
		Sample Size	Mean [1..5]	Sample Size	Mean [1..5]			
Outcome 1	1	12	4.08	17	4.52	29	4.33	
	2	12	3.33	17	4.23	29	3.85	
	3	12	3.83	17	4.41	29	4.17	
	6	12	3.91	17	4.47	29	4.23	
	12	12	4.00	17	4.11	29	4.06	
Outcome 2	15	12	4.33	17	4.17	29	4.23	
Outcome 3	3	12	3.83	17	4.41	29	4.17	
	4	12	3.91	17	4.17	29	4.06	
	6	12	3.91	17	4.47	29	4.23	
	7	12	3.83	17	3.94	29	3.89	
Outcome 4	5	12	3.91	17	3.82	29	3.85	
	9	12	3.75	17	4.05	29	3.92	
Outcome 5	9	12	3.75	17	4.05	29	3.92	
Outcome 6	4	12	3.91	17	4.17	29	4.06	
	7	12	3.83	17	3.94	29	3.89	
	8	12	3.75	17	3.76	29	3.75	
	11	12	4.00	17	4.05	29	4.02	

	13	12	3.50	17	3.70	29	3.61	
	14	12	4.00	17	3.76	29	3.85	
Outcome 7	8	12	3.75	17	3.76	29	3.75	
	13	12	3.50	17	3.70	29	3.61	
	14	12	4.00	17	3.76	29	3.85	
Outcome 8	8	12	3.75	17	3.76	29	3.75	
	13	12	3.50	17	3.70	29	3.61	
	14	12	4.00	17	3.76	29	3.85	
Outcome 9	1	12	4.08	17	4.52	29	4.33	
	10	12	3.91	17	4.00	29	3.96	
	11	12	4.00	17	4.05	29	4.02	

G.5 - Indirect Measure Results: Exit Survey Summary 2023-2024

A. Program Quality. Each item is measured on a 5-point scale with a goal of a mean score of at least 3.75 except question 3 where the goal is between 2.25 and 4.00/year.

Question	Sample Size	Mean [1..5]	>=3.75
1	30	4.33	
2	30	3.73	**Not Met**
3	30	2.70	
4	30	3.60	**Not Met**
5	30	3.66	**Not Met**
6	30	3.70	**Not Met**
7	30	3.76	
8	30	3.23	**Not Met**
9	30	3.46	**Not Met**
10	30	3.83	
11	30	4.13	
12	30	4.23	
13	30	4.06	
14	30	3.80	
15	30	4.30	
16	30	4.40	
17	30	3.80	
18	30	4.03	
19	30	4.06	
20	30	3.70	**Not Met**

Department Student Outcomes. Each item is measured on a 5-point scale with a goal of a mean score of 3.75 except question 3 where the goal is between 2.25 and 4.00/year.

Student Outcome	Question	Average [1..5]	>=3.75
Outcome 5	16	4.40	
Outcome 7	13	4.06	
Outcome 8	12	4.23	
Outcome 9	9	3.46	**Not Met**
	11	4.13	

G.6 - Indirect Measure Results: Alumni Survey Summary 2023-2024

Question	Sample Size	Mean	Target
A. Program Quality. Each item is measured on a 10 point scale with a goal of a mean score of at least 8.0.		**Scale [0..10]**	**>=8.0**
1	0	no data	
2	0	no data	
3	0	no data	
4	0	no data	
B. Department Student Outcomes. Each item is measured on a 5 point scale with a goal of a mean score of 4.0.		**Scale [1..5]**	**>=4.0**
1	0	no data	
2	0	no data	
3	0	no data	
4	0	no data	
5	0	no data	
6	0	no data	
7	0	no data	
8	0	no data	
9	0	no data	
10	0	no data	
11	0	no data	
12	0	no data	
13	0	no data	
14	0	no data	
15	0	no data	
16	0	no data	
17	0	no data	

G.7 - Indirect Measure Results: Advisory Board Feedback 2023-2024

The Lamar Department of Computer Science Advisory Board met on March 24, 2024 in the Lamar Library.

Discussion

Dr. Zhang chaired the meeting.

Written Survey

A survey consisting of 6 questions was provided to members. One survey was returned by one member. Answers to the survey questions are summarized below:

1. Where do you see the biggest growth in technology jobs, requiring a Computer Science degree, within the next five years?

Answers:

There are four areas I believe will see a much faster rate of growth over the next five
years:
a. Artificial Intelligence/Machine Learning
b. Data Science, Big Data, and Data Mining
c. Cyber Security
d. Resiliency and Risk Optimization
I do not necessarily think that AI/ML will be the largest growth area; while it is a
major subject right now, as with many phenomena of this nature, it may become
saturated fairly quickly as more limitation (legal, technical, and ethical) begin to
erode its speed of development.
Increasing breakthroughs in other areas, especially medical, are requiring the ability
to analyze significant amounts of data, so the continued importance of data science
and the mining, storage management, and analytical processes still need to be
further refined in order to continue to produce results in this area.
Cyber security will continue to be a huge field, although It does face some limitations
from a lack of understanding of Its importance across almost all spectrums of work.
While AI will likely play an important role in the expansion of cybersecurity career
path, the increased commoditization of security tools in the workspace requires the

cyber security professionals expand their knowledge of how security INTEGRATES
across all aspects of an organization.
While cloud computing has caused a major paradigm shift in the approach to
resiliency, it must be stressed that reliance upon the cloud to provide this is an
unwise approach to take. Cloud computing still requires resilient solutions and the
companies that heavily Invest in cloud solutions must still have the localized
resiliency to be able to access those environments quickly and securely. This requires
an expanded view of the office ecosystem to include a great deal more attention to
remote, work-from-home, travel access, and other ways employees interact with the
corporate infrastructure.

2. What are the top 5 skills you think Computer Science graduates should have today?

Answers:
Business Analytics
b. Multi-language programming skills (e.g., Java, R, C#, Python, and extensive
training in SECURE coding capabilities,
c. Teamwork in a technical environment
d. Team leadership in a business environment
e. Risk Analysis and Risk Management

3. What other knowledge and/or skills from other disciplines, besides Computer Science, do you feel are very important for computing-related jobs?

Answers:
a. BUSINESS: Marketing, Auditing, Accounting, Business Finance, Human Resources
b. PROJECT MANAGEMENT
C. CORE TEAM COMPETENCIES

4. Do you think Lamar University should add any new courses, concentrations or degrees that would better prepare students for jobs in computing?

Answers:
a. It is difficult to add new courses and concentrations, let alone degrees, without
the requisite fauity to be able to provide this. It may be a better approach to
encourage the Advisory Board and professionals within the community to donate
their time to presentations and workshops that students can attend on their own

time, or though the Student ACM group, to learn a working professional's
experiences in these various areas recommended herein,
b. As students move into junior and senior level courses, teamwork should be
encouraged, and at the Master's level, everything that can be worked as a team
probably should be. Critical teamwork skills are hugely important in executing
successful projects.

5. What programming languages do you recommend the department use as our primary programming language (we currently use Java)?

Answers:

In addition to Java:
a. Javascript
b. C#
c. GO
d. R
e. Python
f. PHP
Ruby
PERL
gh.

6. What do you see is the best way for the CS department to achieve national recognition in 2022 (a degree, a field of study, a research initiative, a student organization, etc.)?

Answers:

a. This is really too large a topic to discuss here. In the absence of a plan, it is
difficult to provide advice on this topic, since we have no common definition
at this point of what "national recognition" entails or just sort of "national
recognition" the department is looking to attain,
b. We have an lAB that can and should be able to provide input and guidance on
this topic. It seems a shame to waste the combined talent of the lAB by not
making more use of them as a knowledge base in many areas of the
department's activities. My first recommendation regarding this question is to
hold a series of WebEx/Zoom/Teams meetings with the lAB members in order
to define the nature of this goal and identify the resources the department
can bring to bear to make it a reality.

G.8 - Indirect Measure Results: ETS Exams 2023-2024

SEMESTER	SAMPLE SIZE	MEAN SCORE	STD. DEVIATION	PROG. FUND.	SYSTEMS	ALGOR.	LOW SCORE	HIGH SCORE
Fall 2002	4	135.5	8.18	sample	size too	small	124	143
Spring 2003	9	144.2	14.43	41.8	33.2	41.3	131	173
Fall 2003	6	151.O	18.28	48.8	36	44.8	131	169
Spring 2004	5	162.2	14.65	sample	size too	small	139	178
FALL 2004	8	153.8	20.9	56.4	36.6	44.9	125	180
Spring 2005	7	172.7	12.32	78.7	55.3	66.3	159	194
Fall 2005	1	175	0	sample	size too	small	175	175
Spring 2006	5	158.2	14.13	sample	size too	small	154	171
Fall 2006	6	142.5	10.89	56	31	31	130	156
Spring 2007	4	156.5	7.93	67	52	40	148	167
Fall 2007	2	161	9.89	66	53	46	154	168
Spring 2008	6	149	11	67	36	31	130	154
Fall 2008	2	149.2	16.1	66	60	44	145	175
Spring 2009	7	150	12	60	46	33	130	164
Fall 2009	5	148	10	59	50	29	133	159
Spring 2010	3	155.3	10.9	65	44	44	140	164
Fall 2010	3	158.3	13.05	71	36	54	148	173
Spring 2011	2	142.5	7.79	50	26	38	137	148
Fall 2011	4	144.8	18.4	53	35	33	127	170
Spring 2012	4	151.1	3				141	165
Fall 2012	5	145.4	10.57				134	158
Spring 2013	5							

Fall 2013	8	161	17	55	62	48	138	181
Spring 2014	8	143	14	38	31	41	123	163
Fall 2014	9	146	14	51	36	34	131	173
Spring 2015	11	134	8	32	22	30	120	150
Fall 2015	3	155	21				142	179
Spring 2016	13	149	16	42	39	45	130	174
Fall 2016	5	141	13	32	34	38	125	157
Spring 2017	12	148	14				122	165
Fall 2017	6	155.3	10.56	63	52	47	140	170
Spring 2018	7	163.8	7.7	65	55	69	120	179
Fall 2018	14							
Spring 2019	18	147.1	15.24	47	47	44	122	178
Fall 2019	14	155.3	16.38				128	179
Spring 2020	22	164.6	16.27				128	188
Fall 2020								
Spring 2021								
Fall 2021								
Spring 2022	21	168	18	71	61	65	120	192
Fall 2022								
Spring 2023	4	144.2	20.05				122	176
Fall 2023	8	141.3	16.7				128	178
Spring 2024	32	157.8	15.4				133	184

Appendix H – Curriculum Map (2022-2023)

I: Introductory course
R: Reinforce course
S: Summative course
*: Indicates those courses may contain the content related to the performance criteria, but do not affect the assessment strategies.

Outcome 1	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Apply UML interaction diagrams and class diagrams to illustrate object models		I	R	R														S	
	Apply important design patterns to OOD									R									S	
	Create useful software architecture documentation				I				R				R		R		R	S	R	
	Develop correct and efficient programs		I	R	R				S						R		R			S
	Debug implemented software in a proficient manner		I	R	S	S														S

	Design user interfaces appropriate to a large software system		I	R										R		R		S	
	Develop user-level documentation for software		I	I	S	R		R	R	R	R	R	R	R	R	R	R	R	S	
Outcome 2.1		COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Be able to develop software to support specific operations on frequently used discrete structures such as lists, trees, and graphs.				S								*				*			
	Be able to use elementary concepts of combinatorics, probability, and statistics to analyze and evaluate the efficiency of algorithms.						I		S											

	Be able to use concepts of discrete mathematics, automata, and finite state machines to explain the design of computer hardware				I	R	I	S												
Outcome 2.2		COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Demonstrate basic understanding of asymptotic notations and time complexity				I		I		S											
	Design efficient algorithms and compare competing designs				I				S										*	
	Demonstrate basic understanding of some design approaches such as greedy algorithms, dynamic programming				I				S											

	and divide-and-conquer																			
	Demonstrate familiarity with standard searching and sorting algorithms and linear and non-linear structures				I		I		S											
Outcome 2.3		COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Demonstrate basic knowledge of equivalences between various types of languages and corresponding accepting devices including Turing Machines.							S												

	Demonstrate basic knowledge of practical applicability of various types of grammar and of some standard representation forms							S											
	Demonstrate knowledge of limitations of computational capability of computer grammars							S		R									
	Demonstrate basic knowledge of equivalences and normal forms of logical formulas in propositional logic						I	S		R									
	Demonstrate basic understanding and appreciation of the various essential programming languages constructs, paradigms, evaluation									S									

	criteria, and language implementation issues																			
	Demonstrate basic knowledge and skills in programming techniques with the focus on concepts and not on a particular language									S										
Outcome 2.4	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Knows the main components of an operating system and their purposes and modes of interaction												S							

	Knows the structure of device drivers and the interaction between device drivers and operating systems.												S						
	Outlines the basic issues in memory management design and virtual memory												S						
	Can develop basic system applications based on operating system APIs												S		R		R		
Outcome 2.5	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Demonstrate the application of Entity-Relational diagrams to model real world problems.																	S		

	Design relations for real world problems including implementation of normal forms, keys, and semantics constraints for each relation.																	S	R	
	Demonstrate competence in implementations of database applications																	S		
Outcome 2.6	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Employ the socket API to program applications among independent hosts.														S		S			
	Explain common network architectures, the services provided by each layer, and the protocols required for connecting peer														S		S			

	layers.																			
	Evaluate network models through simulation and the use of common performance metrics for networks.														S		S			
Outcome 2.7	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Understands modern ISA design principles and employs them to evaluate systems					I								S						
	Know how to measure performance for different computer architectures													S						

	Demonstrate knowledge of hardware implementation of numbers and arithmetic operations					I								S						
Outcome 3	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Be able to justify why selected research methods were chosen and state the intended outcomes of the study				I									S	S		S			
	Identify steps used in a particular study				I									S	S		S			
	Be able to outline and explain the key features of the adopted method				I									S	S		S			
	Analyze and interpret collected data based on the adopted method method and draw				I									S	S		S			

	appropriate conclusions																			
Outcome 4	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Demonstrate understanding of evolving computer technology applications	I									S									
	Demonstrate knowledge of positive social impacts including information globalization, E-Commerce, E-learning and new job creation.	I									S				R		R	*		

	Demonstrate knowledge of negative social impacts including internet pornography, privacy violation, health hazards, computer crimes and dehumanization.	I									S				R		S	*		
	Demonstrate basic understanding of intellectual property protection via copyright and patent law and fair use exception for copyrighted software	I									S							*	S	
Outcome 5	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Know the differences of various philosophical views on ethics such as deontology,										S									

	utilitarianism, egoism, and relativism.																		
	Understand the ACM code of ethics or a similar professional body's code of ethics and principles underlying those ethics.										R							S	
	Honor the property rights of others including copyrights and patents	I									S				R			*	
	Demonstrate ability for ethical decision making within the computer profession.	I									S						R	*	
	Demonstrate knowledge of factors affecting fair resolution of conflicts of interests.	I									S							*	

Outcome 6	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Demonstrate the ability to work in heterogeneous environments which are diverse in gender, ethnicity, and academic accomplishment.	I											R					S	S	
	Attend team meetings and contribute towards solution of technical problems during the meetings	I											R					S	S	
	Make appropriate contributions within their skill set to the completion of the project.	I											R					S	S	
	Demonstrate a sense of interdependence with other team members	I											R					S	S	

Outcome 7	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363
	Demonstrate the ability to communicate in a given situation	I									S	S								
	Demonstrate the ability to comprehend what is said and to show an appreciation of the importance of listening	I									S	S								
	Communicate clearly at the level of the audience the technical material intrinsic to the discipline of computer science.	I									S	S								
	Demonstrate knowledge of the communication process.	I									S	S								
Outcome 8	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363

	Provide an introduction that grabs the attention of readers.	I									R	R	S						S	
	Organize documents in terms of a few main points or themes	I									R	R	S						S	
	Choose appropriate illustrations, examples, or evidence to support the written documents	I									R	R	S						S	
	Write appropriately for specified readers in terms of technical content.	I									R	R	S						S	
	Write organized, grammatically correct reports.	I									R	R	S						S	
Outcome 9	Performance Criteria	COSC 1172	COSC 1336	COSC 1337	COSC 2336	COSC 2372	COSC 2375	COSC 3302	COSC 3304	COSC 3308	COSC 3325	COSC 4272	COSC 4302	COSC 4310	COSC 4333	CPSC 4302	CPSC 4317	CPSC 4340	CPSC 4360	CPSC 4361 4363

	Be able to search scholarly publications to assist in resolving problems.										S	S	*					*	
	Intend to engage in additional formal education or participate in employer-related training or research projects											S							
	Independent study. Participate in Honors program or in undergraduate research at Lamar. This could be done in the STAIRSTEP Program, Presentations or Posters at Professional Conferences, COOP or Internship position reports.											S							

Appendix I - Department Programming Documentation Standard

Programming Documentation Requirements

I. **"External" Documentation (or Program Information):** In programming courses, the comprehensive set of documents that detail the design, development, and structure of a program are usually condensed into a comparatively brief 'block comment' at the top of the source code. This "external" documentation will minimally include:

a. Author(s) name, the course name/number, assignment name/number, instructor's name, and due date.
b. Detailed description of the problem the program was written to solve, including the algorithm used to solve the problem.
c. The program's operational requirements, such as the programming language, special compilation information, and the input information.
d. Required features of the assignment that author(s) were not able to complete, and/or information about the existing bugs.

II. **Documentation about the "Classes":** When writing the code for a class in an object–oriented programming language, it should be preceded by a block comment minimally containing the following:

a. The class name, (author(s) name in team projects,) the names of any external packages upon which the class depends, the name of the package for the classes containing this class (if any), and the inheritance information.
b. An explanation of the purpose of the class.
c. Brief descriptions of the class and instance constants and variables.
d. Brief descriptions of constructors as well as the implemented class and instance methods.

III. **"Internal" Documentation (or in-program documentation):** The details of the program are explained by comments and placed within the code. The internal documentation should minimally include the following:

a. A 'block comment' which should be placed at the head of every method (also known as the function or subprogram). This will include the method name; the purpose of the method; the method's pre– and post–conditions; the method's return value (if any); and a list of all parameters, including direction of information transfer (into this method, out from the method back to the calling method, or both), and their purposes.
b. Meaningful identifier names. Traditionally, simple loop variables may have single letter variable names, but all others should be meaningful. Never use nonstandard abbreviations. If the programming language has a naming convention for variables, methods, classes, etc., then those conventions should be used.

c. Each variable and constant must have a brief comment immediately after its declaration that explains its purpose. This applies to all variables, as well as to fields of structure declarations.
d. Complex sections of the program that need some more explanations should have comments just before or embedded in those program sections.

IV. **Miscellaneous / Optional Requirements:**

a. Write programs with appropriate modularity; that is, create classes when appropriate, write methods that accomplish limited, well-defined tasks, etc.
b. Global/public variables should be avoided in programs, unless it is required.
c. Use "white spaces" (blank lines) to set apart logically related sections of code.
d. Indent bodies of methods, loops, and "if" statements, and do so with a single, consistent style.
e. Unconditional branching (such as the "goto" statement) should be avoided in programs unless it is required for that specific language (such as the assembly language).

Notes. There is a number of standards and tools for program documentation, such as IEEE 1063-2001 "Standard for Software User Documentation" written by IEEE, ISO/IEC 18019-2004 and ISO/IEC TR 9294 written by the International Standards Organization (ISO) and the International Electrotechnical Commission (IEC).

Tools such as Doxygen, javadoc, ROBODoc, and TwinText can be used to auto-generate the code documents. Hence, these tools add more capabilities for document preparation. For example, they are able to extract the comments from the source code and create reference manuals in such forms as text or HTML files.

References

1. O. McCann. "Toward Developing Good Programming Style". http://www.cs.arizona.edu/people/mccann/style.html, [accessed Jan 17, 2012]
2. P. DePasquale. http://www.comtor.org/ [accessed Jan 17, 2011]
3. O. Paull, "The Importance of Software Documentation", [accessed Jan 17, 2012]
4. Dimitri van Heesch: "Doxygen Documentation. Generate documentation from source code", 2012, http://www.stack.nl/~dimitri/doxygen/ [accessed Jan 17, 2012]

Appendix J – Meeting Minutes 2023-2024

Minutes of meetings of Computer Science committees are posted on the Department website for assessment. Some committee minutes may not be publicly accessible.

This appendix includes minutes from meetings during the 2023-2024 year that were relevant to assessment. The following minutes are included:

Assessment Committee Meetings 2023-2024 Academic Year

1. Assessment Committee, August 30, 2024

Department of Computer Science
Assessment Committee Meeting
August 1, 2024
Zoom

Lamar University ABET Assessment Report 2023-2024
Direct and Indirect Measure Comparison 2023-2024

Committee Members:
Dr. Roden, Committee Chair Dr. Liu Dr. Zhang Dr. Makki

Committee Members In Attendance:
Dr. Roden, Committee Chair Dr. Liu Dr. Zhang Dr. Makki

Minutes Taken By: Dr. Roden

Handouts: ABET Direct Measures 2023-2024
ABET Indirect Measures 2023-2024

Dr. Roden called the meeting to order at 2:00 pm.

Assessment of 2023-2024 Academic Year

Dr. Roden began the meeting with reviewing the previous years' data all Curriculum Outcomes. He noted that improvements were all made on the two direct assessment outcomes that did not meet their targets last year.

Dr. Roden noted that all direct measure targets had been met except for five and four were very close to meeting the targets, within a 5% margin. The decision was to notify the relevant faculty.

Dr. Roden noted some student course evaluations, particularly in last spring, did not contain enough evaluation questions. Dr. Zhang notified the appropriate parties that all CS course evaluations should contain the same number of questions (42) in both fall and spring semesters. That was resolved this year and all course evaluations had the proper number of questions included.

Adjournment was at 2:50 pm.

Appendix K – Course Rotation Schedule

	o-Spring		o-Summer		o-Fall		e-Spring		e-Summer		e-Fall		Sections	Desc	Online
COSC	class	online	class	online	class	online	class	online	class	online	class	online			
1172		1				1		1				1	4	every long	every long
1173	2	1	1		2	1	2	1	1		2	1	14	every	
1174	1	1	1		1	1	1	1	1		1	1	10	every	
1324		1				1		1				1	4		every long
1371	7	2	2	1	7	2	7	2	2	1	7	2	42	every	every
1381										1			1	odd summer	odd summer
1336	1	1	1		2	1	1		1		2	1	11	evevy	fall
1337	1	1			1		1	1			1		6	every long	spring
2336	1					1	1				1		4	every long	odd fall
2372	1						1	1					2	spring	odd spring
2375	1		1		1		1			1	1	1	6	every long	odd fall
3301													0		
3302	1							1					2	spring	even spring
3304	1							1					1	spring	even spring
3306		1				1		1				1	4	long	long
3308						1					1		2	fall	odd fall
3320		1				1		1				1	4	every long	every long
3321		1						1					2	spring	spring
3325		1					1						2	spring	odd spring
4272	1				1		1				1		4	every long	

4301													0		
4302	1				1				1			**1**	4	long	even fall
4307			1						1				2	summer	
4309			1										1	odd summer	
4310					1							**1**	1	fall	even fall
4319	1						1						2	even summer	
4322									1				1	even summer	
4333						**1**					1				
4324			1										1	odd summer	
4341	1				1		1				1		4	every long	
4342	1				1		1				1		4	every long	
4345	1						1						2	spring	
CPSC	class	online	class	online	class	online	class	online	class	online	class	online			
3316	1												1	odd spring	
4317					1							**1**	2	fall	even fall
4315			1						1				2	summer	
4328			1						1				2	summer	
4330					1						1		2	fall	
4340			1		1				1			**1**	4	fall & summer	even fall
4360		**1**			1		1				1		4	every spring	odd spring
4361					1						1				
4363					1						1				
4370		**1**					1						2	spring	odd spring
	22	**12**	**10**	**1**	**21**	**9**	**21**	**11**	**10**	2	**19**	**11**			
Sections	**34**		**11**		**30**		**32**		**12**		**30**		**149**		

Appendix L – Advisement by STARS

L.1 – Lamar Enrollment Agreement

LAMAR UNIVERSITY
I WILL Enrollment Agreement

Students who do not meet the requirements for "unconditional admission" to Lamar University will be considered on an individual approval basis termed *I Will* admission. Lamar University is committed to higher educational opportunity and recognizes that traditional formal admission requirements are imperfect predictors of student success. Effort, dedication, and related intangible factors do matter; hence, *I Will*. Lamar is equally committed to student success and behaviors indicative of future achievement. *I Will* students begin their college careers within a structured higher educational environment specifically created with their needs, the needs of their fellow students, and the requirements of the university in mind. Lamar University is committed to providing support for success to *I Will* students through:

Mandatory advisement and registration: *I Will* students are required to meet with Undergraduate Advisement Center advisors at least twice every semester to discuss academic and personal progress, choose classes, and register. Enrollment hours and course selections are subject to advisor approval, and *I Will* students may be required to wait until grades post before enrolling for future semesters or terms. Upon release from the *I Will* agreement, students may still be subject to registration restrictions.

Temporary limits on enrollment: *I Will* students are limited to a maximum of 14 credit hours in their first semester.

Texas Success Initiative (TSI) remediation (if required): *I Will* students who did not pass one or more of the three test areas for college readiness **must** be enrolled in at least **one** of those areas every semester until fully TSI complete.

Support Services: *I Will* students are required to participate in support programs and services offered through Lamar's Center for Academic Success ("STARS" Center). As appropriate, *I Will* students must avail themselves of financial assistance and counseling services offered by the university.

To continue to matriculate at Lamar University, *I Will* students must complete the following requirements during the first semester of enrollment (Please initial after each condition indicating your understanding):

1. Earn nine college-level credit hours. _____ (initial)
2. Earn a grade of "C" or higher in an English or mathematics course. _____ (initial)
3. Earn a grade of "C" or higher in a study skills course (PEDG 1271 or PSYC 2270). _____ (initial)
4. Earn a grade of "C" or higher in LMAR 1101 (University Success Seminar). _____ (initial)
5. Have an overall (cumulative) Lamar University grade point average of 2.0 or above. _____ (initial)

6. Not have an outstanding financial obligation (in excess of $50.00) to LU for the completed semester. _____ (initial)
7. Not have a disciplinary offense, including academic dishonesty (following due process adjudication). _____ (initial)
8. Meet a minimum of twice a semester with an advisor in the Undergraduate Advisement Center. _____ (initial)
9. Utilize support programs and services as appropriate and as recommended by an advisor. _____ (initial)

Student Name (print): _____

ID#: _____ Semester of entry: _____

Attention: *Failure to comply with any of the above conditions will result in suspension from Lamar University without appeal. Students who do not meet* I Will *conditions may return to Lamar University only by transferring at least 18 hours with a 2.0 or higher GPA from another institution. Any exception to admission decisions or conditions requires the approval of the Associate Vice President for Strategic Enrollment Management. As an* I Will *student given this enrollment opportunity, you will be held accountable for the above conditions. Your signature below indicates that you voluntarily elect to accept enrollment under the guidelines stated in this agreement.*

Student Signature: _____ Date: _____

Advisor Signature: _____ Date: _____

L.2 – Advising Communication Timeline – Fall Semester

Advising Communication Timeline - Fall Semester

September	
Early	* Email welcome letter to students: a. Include list of campus resources b. Remind what good academic standing means (2.0 GPA) c. Encourage advisor contact for assistance or questions; include phone number
Mid	* Advisors: begin calling students - Be supportive in asking how classes are going; discuss course load/syllabi - Politely remind students of contract requirements and schedule appointment - Remind students of the 12th class day and explain what that means: a. Students can go to their SSB account and drop a class themselves b. This drop will NOT count toward the 6-drop rule c. This is the last day for a full refund of dropped (not withdrawn) courses
Late	*1st Progress Reports requested
October	
Early	* 1st Progress Reports requested/obtained * Advisors: follow-up phone calls/emails regarding progress reports
Mid	* Advisors: continue calling students and meet with scheduled appointments -Inform students the Class Schedule will be available online end of October
Late	* 2nd Progress Reports requested * Email letter to students: a. Encourage students to follow through with contract requirements b. Schedule a meeting with their advisor; Seek academic assistance c. Indicate last drop/withdrawal date with academic penalty; spring advisement begins November 1st; and conditional registration may be required
November	
Early	* 2nd Progress Reports requested/obtained * Advisors: continue follow-up with students; begin Spring Advisement - Review Progress Reports with students - Explain conditional registration, if required - Confirm phone/email contact information for accuracy and ask students if they have received prior emails
Mid	* Advisors: heavy advisement continues and open registration begins
Late	* Advisors: follow-up phone calls/emails

	* Email letter to students: a. Remind students of consequences of not fulfilling contract requirements b. Encourage students to contact their advisor immediately
December	
Early	* Advisors: heavy advisement and registration continues
Mid	* Email: LU will be closed (list dates); Advisement is mandatory prior to students being allowed to register; Advisement will resume on (date) * Begin evaluating grades as they are available - Contact students about eligibility * Revise Communication Timeline for the Spring term

L.3 – Lamar Retention Programs

College	Program or Unit Name	Year of Inception	Description	Target Population	Funding
Arts & Sciences Dr. Lynn Maurer, Dean					
Biology Dr. Randall Terry, Department Chair					
Chemistry Dr. Ozge Gunaydin-Sen, Department Chair	Tutoring		Tutoring for chemistry students.	We target those who are taking a chemistry course.	Local
Computer Science Dr. Jing Zhang, Deptartment Chair	Stairstep		Tutoring programs for science related majors.	Multi-discipline target including math, physics, earth & space sciences, chemistry and computer science	Local
Earth & Space Sciences Dr. Joe Kruger, Department Chair	Informal Tutoring		On a case-by-case basis try to find upper level students to tutor a student needing assistance in the specific course.	All students in an earth & space science course that requests help from the department.	none
English & Modern Languages Dr. James Sanderson, Department Chair					
History Dr. Rebecca Boone, Department Chair	Informal Tutoring		On a case-by-case basis, a graduate student will try to help out with any History course needed.	Any student in a History course.	none
Mathematics Dr. Jacqueline Jensen-Vallin, Interim Department Chair	Tutoring Lab Mentoring Program	1995	The lab provides free tutorial for students who take lower level mathematics courses including math core courses – College Algebra and Elementary Statistics. Individual faculty members voluntarily serve as mentors for Mathematics majors.	We target those who take lower level mathematics courses including math cores Mathematic majors	Local Funding (tuition and fees) None
Nursing Dr. Cynthia Stinson, Department Chair	The Caring Place	2003	Graduate Assistants provide facilitated learning sessions for students who request/need additional assistance in learning concepts/information. Students sign a contract	Our resource is open to all nursing students who have been admitted into our undergraduate ADN	Initial funding from the THECB grant and support from St. Elizabeth's Hospital. Now funding is internal

			that they will come to The Caring Place prepared (having read the assignments). Our role is to facilitate and support their active learning, bud we do not spoon feed information to them. Our goal is for them to become active learners who know how to learn.	and BSN programs.	Through the use of Graduate Assistants.

L.4 – Tutor Request Form for 2024 (same as 2013 form)

Student Advising and Retention Services

TUTOR REQUEST FORM-SUMMER 2013

(Please Print Legibly or Type)

E-mail to starstutoring@lamar.edu or drop off at the STARS desk in the lobby of the Library.

PERSONAL INFORMATION

Last Name:	First:	Middle:	Student ID#:
Cell Phone:		E-mail:	

Emergency Contact

Name:	Relationship:	Home Phone:	Cell Phone:

ACADEMIC INFORMATION

Major:	Classification:	G.P.A.:

Indicate below the subject/course for which you want tutoring. Include current course grade and professor name, if applicable.

Subject/Course:	Current Grade:	Subject/Course:	Current Grade:	Subject/Course:	Current Grade:
Professor Name:		Professor Name:		Professor Name:	

SCHEDULE INFORMATION

The STARS Tutoring Center is open **Monday-Thursday 9am-4pm.** Sessions are scheduled for 1 hour each week. **Provide as many times as possible when you are available for tutoring.**

Monday	Tuesday	Wednesday	Thursday

The STARS Tutoring Center also provides walk-in tutoring—no appointment is necessary. Walk-in times are available at any time during regular hours on a first come, first serve basis.

If you cannot meet during our regularly scheduled hours, please contact the STARS Tutoring Center at starstutoring@lamar.edu or call 880-7526. We will do our best to accommodate your schedule.

AUTHORIZATION

The tutoring process requires cooperation and communication between student and tutor to be effective. By signing this request, I agree that I will abide by all Student Advising and Retention Services (STARS) tutoring policies. Failure to do so may result in being dropped from the tutoring schedule. I also agree to authorize STARS to gather information regarding my academic record and current academic progress. I give permission for this information to be shared with other academic programs, departments and services as necessary for my academic success. I understand that this information will be kept strictly confidential and will only be used to positively influence my participation in the tutoring program.

_____ _____

Applicant Signature Date

The following information is requested to help us better meet the needs of our students. The information is voluntary and will assist us in gathering data to enhance the services STARS provides.

❑ I am advised in STARS ❑ I am a Lamar University athlete ❑ I am in Student Support Services

Race/Ethnicity: ❑ Black (non-Hispanic) ❑ Caucasian ❑American Indian ❑Asian/Pacific Islander ❑Hispanic/Latino ❑ Other

How were you referred to STARS Tutoring?: ❑ STARS Advisor ❑ Professor ❑ Athletics ❑ Other Advisor ❑ Friend

The STARS Tutoring Center, in coordination with Services for Students with Disabilities, will provide reasonable accommodations for any eligible student who requests tutoring assistance. Inform a STARS staff member if you need an accommodation. Please allow 3 business days to facilitate your accommodation request.

For STARS Tutoring Use Only

Appointment Day and Time_____ **Tutor**_____

Confirmed By_____ **Day and Time**_____