AUBURN UNIVERSITY

PROGRAM ASSESSMENT REPORT

MASTER OF SCIENCE IN COMPUTER SCIENCE AND SOFTWARE ENGINEERING

The Master of Science degree may be earned under a thesis or non-thesis option. The MS (non-thesis) degree requires a minimum of 33 graduate semester credit hours. All courses in the degree must be taken for a grade. The three required 7000-level courses are COMP7270, COMP7300, and COMP7500. Students may take up to three (3) credit hours of COMP7930 Directed Study. Students may take three (3) credit hours of COMP7980 Master of Science Capstone Engineering Project, which is a graded course.

COMP 7270	Advanced Topics in Algorithms	3
COMP 7300	Advanced Computer Architecture	3
COMP 7500	Advanced Topics in Operating Systems	3
Select 18 Credits in COMP 6000-8999		18
Select 6 Credits in @ 6000-8999		6
Total		**33**

The Master of Science degree (thesis option) requires a minimum of 30 graduate semester credit hours. All courses in the degree must be taken for a grade; the exception is COMP 7990 Research and Thesis, which is offered in incomplete/complete format. The three required 7000-level courses are COMP 7270, COMP 7300, and COMP 7500. Students may take up to three (3) credit hours of COMP7930/6 Directed Study. A thesis is required for the MS-CSSE degree (i.e., thesis option). A written proposal supporting the thesis project must be approved by a student's supervisory committee, which is comprised of at least three faculty members. One member of the committee is designated as the major professor (a.k.a., advisor). Students must pass a comprehensive oral examination at the conclusion of their studies. All students with the thesis option are required to submit the Master's Final Examination Form to the graduate school.

COMP 7270	Advanced Topics in Algorithms	3
COMP 7300	Advanced Computer Architecture	3
COMP 7500	Advanced Topics in Operating Systems	3
COMP 7990	Research and Thesis	6
Select 9 Credits in COMP 6000-8999		9
Select 6 Credits in @ 6000-8999		6
Total		**30**

For questions on the assessment report, please email Dr. Xiao Qin (xqin@auburn.edu)

Student Learning Outcomes

The vision of the Master of Science in Computer Science and Software Engineering (MS-CSSE) program at Auburn University is to offer a unique opportunity for Master's students to develop cutting-edge and in-depth knowledge of computer science and software engineering disciplines. We cater to Master's students with an outstanding aptitude and strong analytic skills for software design and development.

1. Specificity of Outcomes

There are four student learning outcomes (SLO 1-4) defined to implement our MS-CSSE program vision.

- **SLO 1:** Students will demonstrate proficiency in core knowledge in algorithms, computer architecture, and operating systems.
- **SLO 2:** Students will be able to implement and test software solutions to problems.
- **SLO 3:** Students will apply reasoning and technical skills to solve problems in at least one area of research.
- **SLO 4:** Students will effectively communicate with non-technical and technical audiences during software lifecycles.

2. Comprehensive Outcomes

The four student learning outcomes (SLOs) listed in Section 1 represent the culmination of all coursework related to the MS-CSSE program. These outcomes represent skills and capabilities that should be fully developed over the course of each MS-CSSE student's education. Although the program offers a broad education allowing MS-CSSE students to improve research and teaching skills in computer science and software engineering disciplines, these SLOs represent the skills and capacities required in careers as computer scientists, researchers, and engineers.

The CSSE faculty measures the SLOs according to the proficiency guidelines offered by the Association of Computing Machinery (ACM), which is the world's largest professional organization for educational and scientific computing. In the past decade, ACM has produced a series of recommendations for university-level graduate Computer Science programs. The MS-CSSE program has adopted the ACM recommendations as its education objectives to train well-prepared master's students. In addition, these four SLOs are in alignment with disciplinary standards set by IEEE Computer Society, Computing Research Association (CRA), and those professionals represented by ACM and IEEE.

The initial version of the SLOs was created by the CSSE graduate programs committee (5 members) through a series of discussion sessions and meetings held between April 2017 to June 2017. In May 2020, the graduate programs committee revised the SLOs; the number of SLOs was cut back from 20 down to 5. The previous version of 20 SLOs makes the program too complicated to assess. We intend to keep the current version unchanged for the next five years. The new SLOs were approved by the CSSE faculty in June 2020. The SLOs will be re-evaluated, reviewed, and ratified in the year 2025.

3. Communicating Student Learning Outcomes

3.1 Faculty

The graduate programs committee was directly involved in the development of the program vision and student learning outcomes. A copy of this assessment report will be disseminated to newly hired faculty

and adjunct faculty members during the orientation week or the beginning of their first academic semester. We have made all the assessment reports available on the department's shared drive to be accessed by all the CSSE faculty and staff members.

3.2 Students

We have provided newly admitted MS-CSSE students with a copy of the program vision and student learning outcomes in their orientation meeting organized by the Graduate Program Officer. The orientation meetings are held at the beginning of the first semester of the program. MS-CSSE Students are introduced about the program assessment methods used by the graduate program committee. The student learning outcomes are posted on the departmental website to disseminate the SLOs information to current and prospective MS-CSSE students.

Curriculum Map

4. Curriculum Map for the MS-CSSE program

The following table is a curriculum map that visually depicts the alignment between the MS-CSSE student learning outcomes (SLOs) and the courses offered from the Fall'12 to Spring'20 semesters. In each cell of the curriculum map, a letter indicates how a course relates to a student learning outcome. Letters "I", "R", and "E" designate courses in the program "introduce", "reinforce", or "emphasize" the corresponding learning outcomes. We assign weights to represent the contributions of the graduate courses to each of the four SLOs. The weights for "introduce", "reinforce", or "emphasize" are 0.33, 0.66, and 1.0, respectively.

Contribution	Weight	Notation
• Introduce:	0.33	I
• Reinforce:	0.66	R
• Emphasize:	1.0	E

The curriculum map was reviewed and approved by the CSSE faculty in June 2020. The graduate programs committee intends to keep the curriculum maps unchanged in the next five years unless one or more learning outcomes are updated before June 2025. We will revisit and update this curriculum map in the spring 2025 semester.

The Curriculum Map of the MS-CSSE Program

Course Outcomes	SLO 1	SLO 2	SLO 3	SLO 4
6000 Web Application Development		E		E
6120 Database Systems I	E	E	I	R
6120 Database Systems I (Summer)	I	E	R	E
6130 Data Mining	E	I	R	E
6320 Design and Analysis of Computer Networks	R	R	E	
6340 Network Quality Assurance and Simulation	I	R	E	
6350 Digital Forensics	I	I	E	I
6360 Wireless and Mobile Networks	E	R	R	I

6370 Computer and Network Security	I		E	
6400 Foundation of Computer Graphics		R	E	
6520 Network and Operating Sys Admin			E	
6530 Cloud Computing		E	I	
6600 Artificial Intelligence	R		E	
6620 User Interface Design and Evaluation		R	E	R
6630 Machine Learning	R	R	R	R
6660 Intro to Evolutionary Comp	R	R	E	R
6700 Software Process		E		
6710 Software Quality Assurance	R	E	E	E
6970 Special Topics: Comp Intel. & Adversarial ML	R	R	E	R
6970 Special Topics: Game Design for Social Change	E	I	E	E
6970 Special Topics: Cybersecurity Threats&CounterM	E	E	E	E
6970 Special Topics: Cyber Physical Systems Security			I	I
6970 Special Topics: Computational Biology		R	E	E
6970 Special Topics: Computer Security at the Fringes			E	
6970 Special Topics: Deep Learning	R	R	E	R
6970 Special Topics: Game Design and Development	R	E	I	
6970 Special Topics: Information Retrieval		R	I	I
6970 Special Topics: Security in Wireless Networks	E	R	I	I
6970 Special Topics: Software Analytics		E	E	R
6970 Special Topics: iOS Development	E	R		R
7120 Database Systems II			E	E
7270 Advanced Topics in Algorithms	E	E	E	E
7300 Advanced Computer Architecture	E	R	E	R
7330 Topics in Parallel and Distributed Computing		R	E	I
7370 Advanced Computer and Network Security	E	E	E	E
7500 Advanced Topics in Operating Systems	E	R	I	I
7620 Human Computer Interaction		I	E	I
7700 Software Architecture		E		
7720 Software Re-Engineering	I			I
7950 Introduction Graduate Study Computer Science				I
7970 Natural Language Processing		E	R	R
7930 Directed Study	R	R	E	E
7990 Research and Thesis	R	R	E	E
Weights	19.25	26.20	30.61	21.90

Measurement

5. Outcome-Measure Alignment

All the student learning outcomes are assessed using a combination of pre-tests and post-tests, quizzes, midterm and final exams, written assignments, programming assignments, course projects, or presentations. A handful of rubrics have been developed to assess homework and project assignments (e.g., written communication, oral communication, projects).

The outcome-measure alignment is listed in the table below. Notation: QZ - Quiz, PE – Pre-test, ME – Midterm Exams, FE – Final Exams, WA – Written Assignments, PA -Programming Assignments, PT – Presentations, PJ – Projects, QF – Qualifying Exam, PD – Proposal Defense, FD – Final Defense, ID – Indirect, SV – Survey.

The outcome-measure alignment for the MS-CSSE Program

Outcomes	QZ	PE	ME	FE	WA	PA	PJ	PT	QF	PD	FD	ID	SV
SLO 1	X		X	X	X	X			X				
SLO 2		X	X	X			X						
SLO 3					X		X	X		X	X		
SLO 4							X			X	X	X	X

6. Direct Measures

Each student learning outcome has a list of direct measurements. Direct measures, requiring master's students to demonstrate their knowledge and skills, will provide tangible, visible and self-explanatory evidence of what our graduate students have and have not learned as a result of graduate courses and the master's program. In this section, we elaborate on various ways of measuring actual student behaviors.

- Authentic Course-Embedded Measures
  - Exams
  - Quizzes
  - Oral Presentations
  - Assignments
  - Projects.
- Exit Exams: Final Oral Examination (Final Thesis Defense).

6.1 Authentic Course-Embedded Measures

This type of direct measures includes exams, tests, quizzes, oral presentations, quizzes, assignments. We believe the direct measures in this category are most effective because the measures are course-embedded, which means the work accomplished by our Ph.D. students are actually work that counts towards a grade. Our Ph.D. students are likely to take the learning activity more seriously if associated with grades. We directly gauge student knowledge and skills by the virtue of authentic and part of already existing student work. The disadvantage of this method is two-fold: it is immensely time-consuming, and it is difficult to collect data to forge an annual

assessment report. For this reason, we also rely on the following direct measures of student learning.

6.2 Exit Exams: Final Thesis and Project Defense

The final oral examination (also referred to as final thesis or project defense) takes place at the conclusion of a master's thesis research or capstone engineering project. The examination will be administered by the candidate's advisory committee in accordance with the Auburn University Bulletin. Before this examination can be taken, the student must have satisfied all the other course requirements for the master's degree.

The final exams are open to the public. Master's students should give an abstract of the thesis or capstone project to the departmental secretary at least one business day in advance of the examination for dissemination to the CSSE graduate student body.

7. Data Collection

CSSE graduate faculty members have taught a total of 33 graduate-level courses in the academic year 2021-2022. At the end of the spring 2022 semester, the director of graduate programs (GPO) designed a course-level data collection form shared on the Google Spreadsheet. After the data-collection requests were sent to the instructors, the data collection spreadsheet was collaboratively updated by the CSSE graduate faculty. The response rate is higher than 90%.

For all the four student learning outcomes, individual faculty members collect data for the graduate courses, usually in a wide variety of forms, including quizzes, exams, assignments, course projects, and presentations. The examinations consist of a series of questions administered in class at the end of the semester. The quiz and exam answers are reviewed by the faculty members and reported to the assessment coordinator.

In each graduate course, the faculty member aligned at least one of the direct measures - exams, tests, quizzes, oral presentations, quizzes, and assignments - to at least one of the four student learning outcomes. For each direct measure in a graduate course, student performance ratings are categorized in five camps depending on score ranges:

Direct Measure Rating	Score Range	Notation
• Outstanding Mastery:	[90, 100]	OM
• Above Satisfactory Mastery:	[80, 90)	AM
• Satisfactory Mastery:	[70, 80)	SM
• Partial Mastery:	[60, 70)	PM
• Minimal or no evidence of Mastery:	[0, 60)	MM

The table below includes all relevant information with regards to how the direct assessment was conducted and the rationale for choosing specific measurement methods.

The Detailed Information on Direct Assessment Methods

Learning Outcomes	SLO 1	SLO 2	SLO 3	SLO4
Direct Measure Description	Exams and Quizzes	Programming Assignment and Projects	Assignment and Projects	Presentations and Written Reports
Samples	All students enrolled in COMP 7270, 7300, 7500, 6120, 6320, 6360	All students enrolled in COMP 6000, 6120, 6530, 6700, 7370, 7700	All students enrolled in COMP 6320, 6340, 6370, 6600, 6620, 6970	All students enrolled in COMP 6120, 6130, 6970, 7120, 7370, 7970
When	Final exam week; fall and spring semesters	Last week of fall, spring, and summer semesters	Last week of fall and spring semesters	Presentation weeks of fall and spring semesters
Where	Final Week and In-Class or Canvas	Canvas	Canvas	Canvas
How	Faculty or GTA graded	Faculty or GTA graded	Faculty or GTA graded	Faculty or GTA graded
Desired Results	The class average should be rated as "Outstanding Mastery"	The class average should be rated as "Outstanding Mastery"	The class average should be rated as "Outstanding Mastery"	The class average should be rated as "Outstanding Mastery"

Each course's score is derived from the above direct measures. Importantly, the enrollment of a course is treated as the course weight during the data aggregation process, meaning that a course with high enrollment contributes to the final SLO scores more significantly than those with low enrollments. Recall that the curriculum map articulated in Section 4 on page 3 indicates that each course has impacts on one or more SLOs. Such impacts are measured in terms of "introduce" (I), "reinforce" (R), or "emphasize" (E). To aggregate course-level data, we assign 1.00, 0.66, and 0.33 to "introduce" (I), "reinforce" (R), or "emphasize" (E) in the curriculum map. We apply this assignment strategy because a course that "emphasize" on a SLO offers more pronounced contributions than another course rated as "introduce".

Oral and written communication skills (SLO 4) are assessed throughout course projects, directed studies, research and thesis, starting with the introductory course. The rubrics are used to assess both written and oral communication skills during software development lifecycles. The faculty members complete the rubric distributed to students to improve their communication performance. All scores for written reports and presentations are collected by the assessment coordinator at the end of each semester.

Student capabilities to carry out real-world projects (SLO 2) are assessed through class projects (e.g., COMP 6710, COMP 7120, COMP 7330, and COMP 7980). A rubric for each course project is provided to help identify areas where students' capability needs improvement.

All MS-CSSE students complete either a project or a thesis. A student's supervisor completes a performance evaluation form to assess the student's communication, research, and software development skills. The survey is provided as a google document, which is completed either offline or online. To offer feedback to MS-CSSE students, evaluations are completed at mid-semester with results reported to the student. Final evaluations are completed at the end of each semester collected by the assessment coordinator.

Results

8. Reporting Results

8.1 Assessment Results of the Four SLOs

Recall that in each graduate course, the faculty member aligned at least one of the direct measures - exams, tests, quizzes, oral presentations, quizzes, and assignments - to at least one of the four student learning outcomes. Given direct measures in the graduate courses, the instructors rated student performance in the following five categories depending on score ranges.

Direct Measure Rating	Score Range	Notation
• Outstanding Mastery:	[90, 100]	OM
• Above Satisfactory Mastery:	[80, 90)	AM
• Satisfactory Mastery:	[70, 80)	SM
• Partial Mastery:	[60, 70)	PM
• Minimal or no evidence of Mastery:	[0, 60)	MM

The score of each course is mapped to the four SLOs according to the curriculum map delineated in Section 4 on page 3. The SLO scores contributed by each graduate course are listed in the table below. It is noteworthy that all the scores recorded in the following table are automatically derived from the curriculum map coupled with the above course-level direct measurement data.

The direct measurement data, the collection method of which are articulated in Sections 5 and 6, are summarized in the following table.

The Direct Measurement Data for the MS-CSSE Program
(Part 4-1)

Course-Level Assessment Data						
Course		MS-CSSE Students				
		A	B	C	D	F
COMP 6000	# of Students	22	0	0	0	0
Marghitu	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	22
COMP 6120	# of Students	26	0	0	0	0
Ku (Spring/Fall)	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	26
COMP 6210	# of Students	0	0	0	0	0
Mulder	% of Students					
			Score	0.0	Count	0
COMP 6130	# of Students	15	0	1	0	0
Zhou	% of Students	93.8%	0.0%	6.3%	0.0%	0.0%
			Score	96.9	Count	16
COMP 6320	# of Students	7	5	5	0	0
Shu	% of Students	41.2%	29.4%	29.4%	0.0%	0.0%
			Score	77.9	Count	17
COMP 6350	# of Students	0	0	0	0	0
Cuneo	% of Students					
			Score	0.0	Count	0
COMP 6360	# of Students	1	2	0	0	0
Lim	% of Students	33.3%	66.7%	0.0%	0.0%	0.0%
			Score	83.3	Count	3
COMP 6370	# of Students	0	0	0	0	0
Springall	% of Students					
			Score	0.0	Count	0
COMP 6520	# of Students	0	0	0	0	0
Umphress (Summer)	% of Students					
			Score	0.0	Count	0
COMP 6530	# of Students	0	0	0	0	0
Sardinas	% of Students					
			Score	0.0	Count	0
COMP 6600	# of Students	0	0	0	0	0
Liu	% of Students					
			Score	0.0	Count	0

The Direct Measurement Data for the MS-CSSE Program
(Part 4-2)

Course-Level Assessment Data						
Course		MS-CSSE Students				
		A	B	C	D	F
COMP 6620	# of Students	0	0	0	0	0
Seals	% of Students					
			Score	0.0	Count	0
COMP 6630	# of Students	7	5	0	0	0
A. Nguyen/Karmaker	% of Students	58.3%	41.7%	0.0%	0.0%	0.0%
			Score	89.6	Count	12
COMP 6660	# of Students	3	3	3	0	0
Tauritz	% of Students	33.3%	33.3%	33.3%	0.0%	0.0%
			Score	75.0	Count	9
COMP 6700	# of Students	1	0	0	0	1
Umphress	% of Students	50.0%	0.0%	0.0%	0.0%	50.0%
			Score	50.0	Count	2
COMP 6710	# of Students	2	1	5	0	0
Rahman	% of Students	25.0%	12.5%	62.5%	0.0%	0.0%
			Score	65.6	Count	8
COMP 6970-CTCM	# of Students	0	0	0	0	0
Cuneo	% of Students					
			Score	0.0	Count	0
COMP 6970-CPS	# of Students	1	1	0	0	0
Yampolskiy	% of Students	50.0%	50.0%	0.0%	0.0%	0.0%
			Score	87.5	Count	2
COMP 6970-BPA	# of Students	2	0	0	0	0
Mulder	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	2
COMP 6970-GDSC	# of Students	0	0	0	0	0
Thomas	% of Students					
			Score	0.0	Count	0
COMP 7970-Research EC	# of Students	0	0	0	0	0
Tauritz	% of Students					
			Score	0.0	Count	0

The Direct Measurement Data for the MS-CSSE Program

(Part 4-3)

Course-Level Assessment Data						
Course		MS-CSSE Students				
		A	B	C	D	F
COMP 6970	# of Students	9	0	0	0	0
Heaton	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	9
COMP 6970	# of Students	0	0	0	0	0
A Nguyen	% of Students					
			Score	0.0	Count	0
COMP 6970	# of Students	0	0	0	0	0
Seals	% of Students					
			Score	0.0	Count	0
COMP 6970-IR	# of Students	3	0	0	0	0
Karmaker	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	3
COMP 6830	# of Students	0	0	0	0	0
Springall	% of Students					
			Score	0.0	Count	0
COMP 6970	# of Students	0	0	0	0	0
Sardinas	% of Students					
			Score	0.0	Count	0
COMP 6970 iOS	# of Students	0	0	0	0	0
Chapman	% of Students					
			Score	0.0	Count	0
COMP 7270	# of Students	36	1	1	0	0
Zhou	% of Students	94.7%	2.6%	2.6%	0.0%	0.0%
			Score	98.0	Count	38
COMP 7300	# of Students	26	15	1	0	0
Baskiyar	% of Students	61.9%	35.7%	2.4%	0.0%	0.0%
			Score	89.9	Count	42
COMP 7370	# of Students	3	0	0	0	0
Shu	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	3
COMP 7500	# of Students	26	12	7	0	0
Qin	% of Students	57.8%	26.7%	15.6%	0.0%	0.0%
			Score	85.6	Count	45

The Direct Measurement Data for the MS-CSSE Program

(Part 4-4)

Course-Level Assessment Data						
Course		MS-CSSE Students				
		A	B	C	D	F
			Score	85.6	Count	45
COMP 7620	# of Students	0	0	0	0	0
Seals	% of Students					
			Score	0.0	Count	0
COMP 7720	# of Students	2	1	1	0	0
Yamposkiy	% of Students	50.0%	25.0%	25.0%	0.0%	0.0%
			Score	81.3	Count	4
COMP 7970-NLP	# of Students	2	0	0	0	0
Karmaker	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	2
COMP 7990/8990	# of Students	8	0	0	0	0
Qualtrics Measure 1	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	8
COMP 7990/8990	# of Students	7	2	0	0	0
Qualtrics Measure 2	% of Students	77.8%	22.2%	0.0%	0.0%	0.0%
			Score	94.4	Count	9
COMP 7990/8990	# of Students	6	3	0	0	0
Qualtrics Measure 3	% of Students	66.7%	33.3%	0.0%	0.0%	0.0%
			Score	91.7	Count	9
COMP 7990/8990	# of Students	5	4	0	0	0
Qualtrics Measure 4	% of Students	55.6%	44.4%	0.0%	0.0%	0.0%
			Score	88.9	Count	9
COMP 7990/8990	# of Students	9	0	0	0	0
Qualtrics Measure 5	% of Students	100.0%	0.0%	0.0%	0.0%	0.0%
			Score	100.0	Count	9
COMP 7990/8990	# of Students	7	2	0	0	0
Qualtrics Measure 6	% of Students	77.8%	22.2%	0.0%	0.0%	0.0%
			Score	94.4	Count	9
COMP 7990/8990	# of Students	7	2	0	0	0
Qualtrics Measure 7	% of Students	77.8%	22.2%	0.0%	0.0%	0.0%
			Score	94.4	Count	9
COMP 7990/8990	# of Students	7	2	0	0	0
Qualtrics Measure 8	% of Students	77.8%	22.2%	0.0%	0.0%	0.0%
			Score	94.4	Count	9
COMP 7990/8990	# of Students	6	3	4	0	0
Qualtrics Measure 9	% of Students	46.2%	23.1%	30.8%	0.0%	0.0%
			Score	78.8	Count	13

It is noteworthy that we present the direct measured data collected at the level of lecture-based courses. The assessment data from directed study, capstone engineering project, and thesis research were also collected in the fall 2021 and spring 2022 semesters. The results of the thesis defense can be found in Section 8.2 on page 8. Each SLO metric is evaluated on the scale from 100 to 0, where a score in [100, 90] is *Exemplary*, (90, 80) is *Proficient*, (80, 70) is *Acceptable*, and (70, 0) is *Deficient*. The following table summarizes the SLO results derived from the direct measurement methods.

The SLO Results Derived from the Direct Measurement Data (Part 1-5)

	SLO 1	SLO 2	SLO 3	SLO 4	SLO 1	SLO 2	SLO 3	SLO 4
6000 Web Application Development		1.00		1.00		4.00		4.00
6120 Database Systems I (Fall/Spring)	1.00	1.00	0.33	0.66	5.00	5.00	1.65	3.30
6130 Data Mining	1.00	0.33	0.66	1.00	3.00	0.99	1.98	3.00
6210 Compiler Construction	0.66	1.00	0.33	0.66	0.66	1.00	0.33	0.66
6320 Design and Analysis of Computer Networks	0.66	0.66	1.00		3.30	3.30	5.00	
6340 Network Quality Assurance and Simulation	0.33	0.66	1.00					
6350 Digital Forensics	0.33				0.00			
6360 Wireless and Mobile Networks	1.00	0.66	1.00	0.66	0.00	0.00	0.00	0.00
6370 Computer and Network Security	0.33		1.00		0.00		0.00	
6400 Foundation of Computer Graphics		0.66	1.00					
6520 Network and Operating Sys Admin			1.00				0.00	
6530 Cloud Computing		1.00	0.33			0.00	0.00	
6600 Artificial Intelligence	0.66		1.00		0.00		0.00	
6620 User Interface Design and Evaluation		0.66	1.00	0.66		0.00	0.00	0.00
6630 Machine Learning	0.66	0.66	0.66	0.66	3.30	3.30	3.30	3.30
6660 Intro to Evolutionary Comp	0.66	0.66	1.00	0.66	1.98	1.98	3.00	1.98
6700 Software Process		1.00						
6710 Software Quality Assurance	0.66	1.00	0.66	1.00	0.66	1.00	0.66	1.00
6970 Special Topics: Comp Intel. & Adversarial ML	0.66	0.66	1.00	0.66	0.00	0.00	0.00	0.00
6970 Special Topics: Game Design for Social Change	1.00	0.33	1.00	1.00	0.00	0.00	0.00	0.00
6970 Special Topics: Cybersecurity Threats&CounterM	1.00	0.33	0.33		0.00	0.00	0.00	
6970 Special Topics: Cyber Physical Systems Security			0.66	0.66			1.98	1.98
6970 Special Topics: Computational Biology		0.66	1.00	1.00		0.66	1.00	1.00
6970 Special Topics: Deep Learning	0.66	0.66	1.00	0.66	0.00	0.00	0.00	0.00
6970 Special Topics: Game Design and Development	0.66	1.00	0.33		0.00	0.00	0.00	
6970 Special Topics: Information Retrieval		0.66	0.33	0.66		1.98	0.99	1.98
6830 Cybersecurity Threats and Countermeasures	1.00	0.66	1.00	0.66	0.00	0.00	0.00	0.00
6970 Special Topics: Software Analytics		1.00	1.00	0.66		0.00	0.00	0.00
6970 Special Topics: iOS Development	1.00	0.66	0.00	0.66	0.00	0.00	0.00	0.00
6970 Special Topics: Binary Program Analysis	0.33	0.66	1.00	0.66	0.33	0.66	1.00	0.66
7120 Database Systems II			1.00	1.00				
7270 Advanced Topics in Algorithms	1.00	1.00	1.00	1.00	18.00	18.00	18.00	18.00
7300 Advanced Computer Architecture	1.00	0.66	1.00	0.33	26.00	17.16	26.00	8.58
7330 Topics in Parallel and Distributed Computing		0.66	1.00	0.33				
7370 Advanced Computer and Network Security	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00

The SLO Results Derived from the Direct Measurement Data (Part 2-5)

Course Outcomes	SLO 1	SLO 2	SLO 3	SLO 4	SLO 1	SLO 2	SLO 3	SLO 4
7500 Advanced Topics in Operating Systems	1.00	0.66	0.33	0.33	45.00	11.22	5.61	14.85
7620 Human Computer Interaction	0.00	0.33	1.00	0.33		0.00	0.00	0.00
7700 Software Architecture	0.00	1.00	0.00	0.00				
7720 Software Re-Engineering	0.33	0.00	0.00	0.33	1.32	0.00	0.00	1.32
7950 Introduction Graduate Study Computer Science	0.00	0.00	0.00	0.33				
7970 Natural Language Processing	0.00	1.00	0.66	0.66		2.00	1.32	1.32
7930 Directed Study	0.66	0.66	1.00	1.00				
7990 Research and Thesis, Measure 1	1.00	0.00	0.00	0.00	8.00	0.00	0.00	0.00
7990 Research and Thesis, Measure 2	0.00	0.00	1.00	0.00	0.00	0.00	2.25	0.00
7990 Research and Thesis, Measure 3	0.00	0.00	1.00	0.00	0.00	0.00	2.25	0.00
7990 Research and Thesis, Measure 4	0.00	0.00	1.00	0.00	0.00	0.00	2.25	0.00
7990 Research and Thesis, Measure 5	0.00	0.00	0.00	1.00	0.00	0.00	0.00	2.25
7990 Research and Thesis, Measure 6	0.00	0.00	0.00	1.00	0.00	0.00	0.00	2.25
7990 Research and Thesis, Measure 7	0.00	0.00	1.00	0.00	0.00	0.00	4.50	0.00
7990 Research and Thesis, Measure 8	0.00	0.00	0.00	1.00	0.00	0.00	0.00	2.25
7990 Research and Thesis, Measure 9	0.00	0.00	0.00	1.00	0.00	0.00	0.00	3.25
Weights	20.58	27.20	34.94	26.22	213.34	161.52	177.20	168.52
Aggregate Scores								
Final Scores								
Ratings								

The SLO Results Derived from the Direct Measurement Data (Part 3-5)

Course Outcomes	SLO 1	SLO 2	SLO 3	SLO 4
6000 Web Application Development		400.00		400.00
6120 Database Systems I	2600.00	2600.00	858.00	1716.00
6120 Database Systems I (Summer)	0.00	0.00	0.00	0.00
6130 Data Mining	1550.00	511.50	1023.00	1550.00
6210 Compiler Construction				
6320 Design and Analysis of Computer Networks	874.50	874.50	1325.00	0.00
6340 Network Quality Assurance and Simulation				
6350 Digital Forensics				
6360 Wireless and Mobile Networks	250.00	165.00	165.00	82.50
6370 Computer and Network Security	0.00		0.00	
6400 Foundation of Computer Graphics				
6520 Network and Operating Sys Admin				
6530 Cloud Computing		0.00	0.00	
6600 Artificial Intelligence	0.00		0.00	

The SLO Results Derived from the Direct Measurement Data
(Part 4-5)

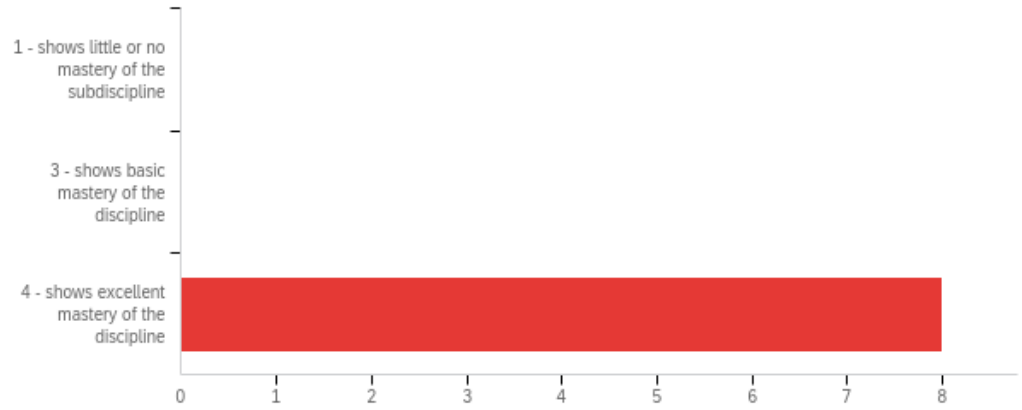
Course Outcomes	SLO 1	SLO 2	SLO 3	SLO 4
6620 User Interface Design and Evaluation		0.00	0.00	0.00
6630 Machine Learning	709.50	709.50	709.50	709.50
6660 Intro to Evolutionary Comp	445.50	445.50	675.00	445.50
6700 Software Process				
6710 Software Quality Assurance	346.50	525.00	525.00	525.00
6970 Special Topics: Comp Intel. & Adversarial ML	0.00	0.00	0.00	0.00
6970 Special Topics: Game Design for Social Change	0.00	0.00	0.00	0.00
6970 Special Topics: Cybersecurity Threats&CounterM	0.00	0.00	0.00	0.00
6970 Special Topics: Cyber Physical Systems Security	0.00	0.00	86.63	86.63
6970 Special Topics: Computational Biology	0.00	594.00	900.00	900.00
6970 Special Topics: Computer Security at the Fringes			0.00	
6970 Special Topics: Deep Learning	0.00	0.00	0.00	0.00
6970 Special Topics: Game Design and Development	0.00	0.00	0.00	0.00
6970 Special Topics: Information Retrieval	0.00	198.00	99.00	99.00
6970 Special Topics: Security in Wireless Networks		0.00	0.00	0.00
6970 Special Topics: Software Analytics				
6970 Special Topics: iOS Development	0.00	0.00	0.00	0.00
6970 Special Topics: Binary Program Analysis	66.00	132.00	200.00	132.00
7120 Database Systems II				
7270 Advanced Topics in Algorithms	3725.00	3725.00	3725.00	3725.00
7300 Advanced Computer Architecture	3775.00	2491.50	3775.00	2491.50
7330 Topics in Parallel and Distributed Computing				
7370 Advanced Computer and Network Security	300.00	300.00	300.00	300.00
7500 Advanced Topics in Operating Systems	3850.00	959.93	479.97	1270.50
7620 Human Computer Interaction		0.00	0.00	0.00
7700 Software Architecture				
7720 Software Re-Engineering	107.25	0.00	0.00	107.25
7950 Introduction Graduate Study Computer Science				
7970 Natural Language Processing	0.00	200.00	132.00	132.00
7930/7980 Directed Study and Capstone Projects	264.00	132.00	200.00	400.00
7990 Research and Thesis - Masters 1	800.00	0.00	0.00	0.00

The SLO Results Derived from the Direct Measurement Data
(Part 5-5)

Course Outcomes	SLO 1	SLO 2	SLO 3	SLO 4
7930/7980 Directed Study and Capstone Projects	264.00	132.00	200.00	400.00
7990 Research and Thesis, Measure 1	800.00	0.00	0.00	0.00
7990 Research and Thesis, Measure 2	0.00	0.00	212.50	0.00
7990 Research and Thesis, Measure 3	0.00	0.00	206.25	0.00
7990 Research and Thesis, Measure 4	0.00	0.00	200.00	0.00
7990 Research and Thesis, Measure 5	0.00	0.00	0.00	225.00
7990 Research and Thesis, Measure 6	0.00	0.00	0.00	212.50
7990 Research and Thesis, Measure 7	0.00	0.00	425.00	0.00
7990 Research and Thesis, Measure 8	0.00	0.00	0.00	212.50
7990 Research and Thesis, Measure 9	0.00	0.00	0.00	256.25
Weights				
Aggregate Scores	19663.25	14963.43	16221.84	15978.63
Final Scores	91.0	91.9	90.5	92.6
Ratings	Exemplary	Exemplary	Exemplary	Exemplary

8.2 Assessment Results of Thesis Final Defense

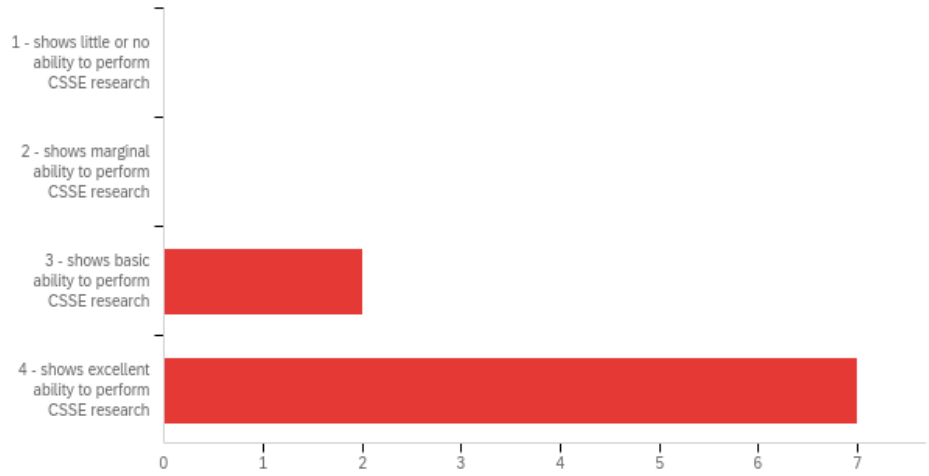
1 - Each MS (Thesis Option) student is expected to demonstrate mastery of the basic principles of at least one of the disciplines of CSSE. Please assess this student using the following scale



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Each MS (Thesis Option) student is expected to demonstrate mastery of the basic principles of at least one of the disciplines of CSSE. Please assess this student using the following scale	4.00	4.00	4.00	0.00	0.00	8

#	Answer	%	Count
1	1 - shows little or no mastery of the subdiscipline	0.00%	0
3	3 - shows basic mastery of the discipline	0.00%	0
4	4 - shows excellent mastery of the discipline	100.00%	8
	Total	100%	8

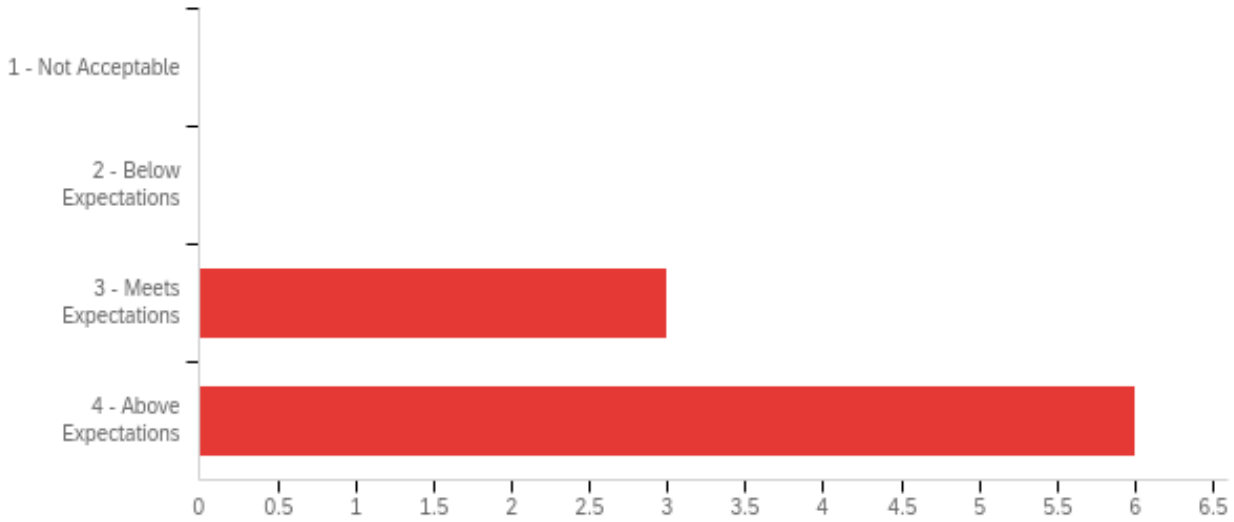
2 - Each MS (Thesis Option) student is expected to perform cutting-edge research in at least one area of specialty. Please assess this candidate using the following scale:



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Each MS (Thesis Option) student is expected to perform cutting-edge research in at least one area of specialty. Please assess this candidate using the following scale:	3.00	4.00	3.78	0.42	0.17	9

#	Answer	%	Count
1	1 - shows little or no ability to perform CSSE research	0.00%	0
2	2 - shows marginal ability to perform CSSE research	0.00%	0
3	3 - shows basic ability to perform CSSE research	22.22%	2
4	4 - shows excellent ability to perform CSSE research	77.78%	7
	Total	100%	9

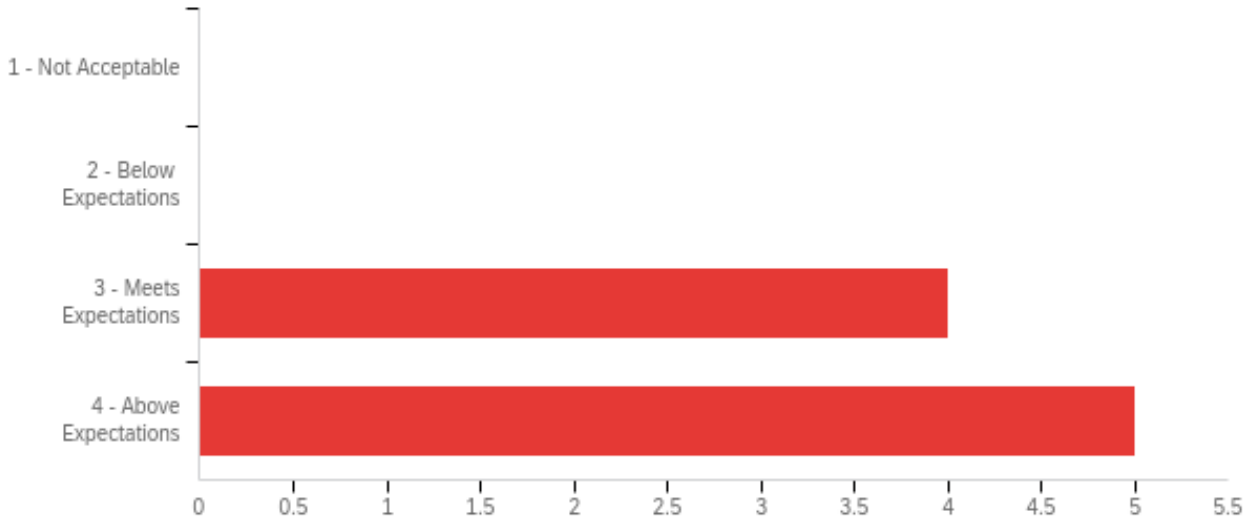
3 - Content: appropriate, complete, concise, and logically organized; problem, approach and results clear; appropriate use of time.



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Content: appropriate, complete, concise, and logically organized; problem, approach and results clear; appropriate use of time.	3.00	4.00	3.67	0.47	0.22	9

#	Answer	%	Count
1	1 - Not Acceptable	0.00%	0
2	2 - Below Expectations	0.00%	0
3	3 - Meets Expectations	33.33%	3
4	4 - Above Expectations	66.67%	6
	Total	100%	9

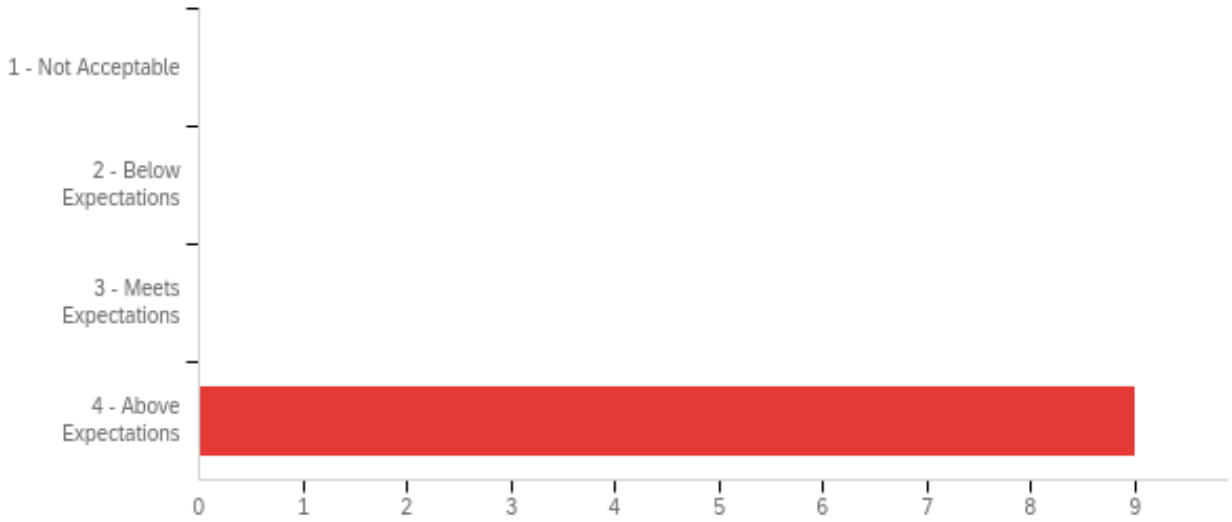
4 - Visual aids: readable & clear, concise wording, effective use of graphics, appropriate amount of information.



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Visual aids: readable & clear, concise wording, effective use of graphics, appropriate amount of information.	3.00	4.00	3.56	0.50	0.25	9

#	Answer	%	Count
1	1 - Not Acceptable	0.00%	0
2	2 - Below Expectations	0.00%	0
3	3 - Meets Expectations	44.44%	4
4	4 - Above Expectations	55.56%	5
	Total	100%	9

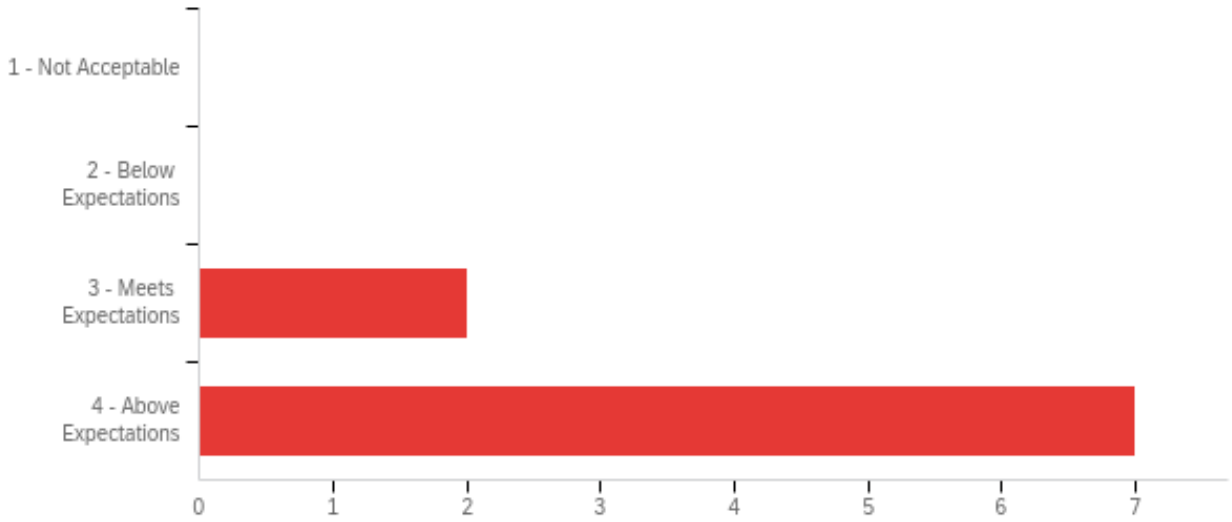
5 - Presenter: appears well-prepared, vocabulary technically correct and audience appropriate.



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Presenter: appears well-prepared, vocabulary technically correct and audience appropriate.	4.00	4.00	4.00	0.00	0.00	9

#	Answer	%	Count
1	1 - Not Acceptable	0.00%	0
2	2 - Below Expectations	0.00%	0
3	3 - Meets Expectations	0.00%	0
4	4 - Above Expectations	100.00%	9
	Total	100%	9

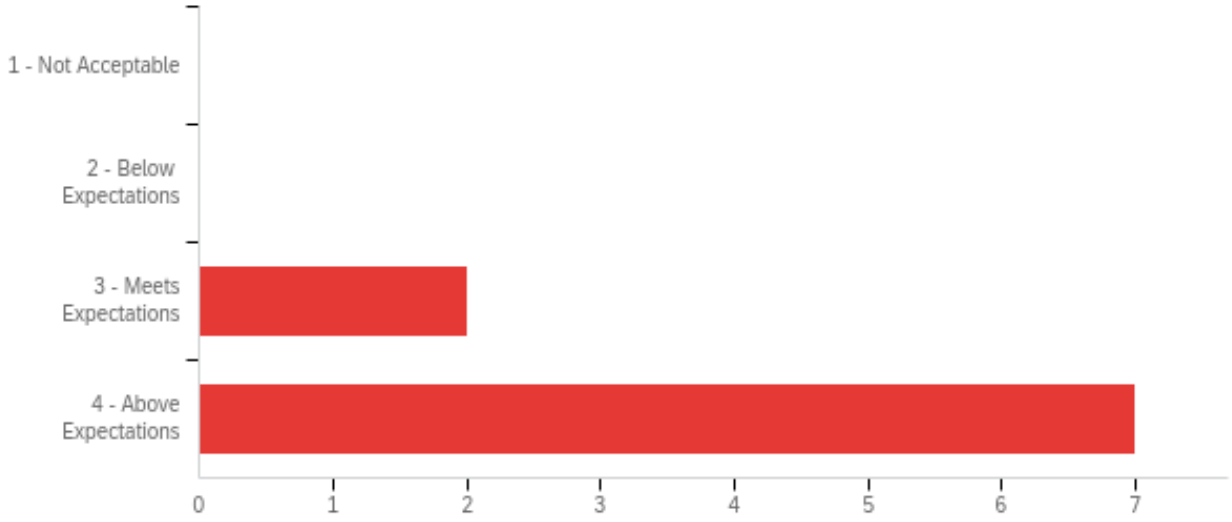
6 - Presentation mechanics: good voice volume, enunciation, speed; free of hesitations, distracting mannerisms; good poise, eye contact.



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Presentation mechanics: good voice volume, enunciation, speed; free of hesitations, distracting mannerisms; good poise, eye contact.	3.00	4.00	3.78	0.42	0.17	9

#	Answer	%	Count
1	1 - Not Acceptable	0.00%	0
2	2 - Below Expectations	0.00%	0
3	3 - Meets Expectations	22.22%	2
4	4 - Above Expectations	77.78%	7
	Total	100%	9

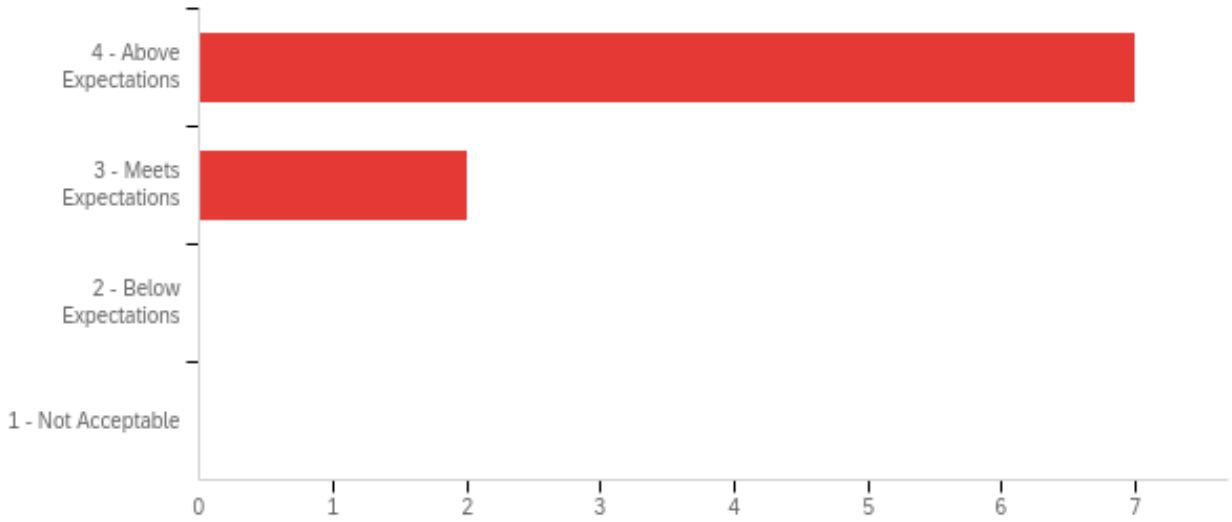
7 - Responses to questions and comments: appropriate, direct, and complete



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Responses to questions and comments: appropriate, direct, and complete	3.00	4.00	3.78	0.42	0.17	9

#	Answer	%	Count
1	1 - Not Acceptable	0.00%	0
2	2 - Below Expectations	0.00%	0
3	3 - Meets Expectations	22.22%	2
4	4 - Above Expectations	77.78%	7
	Total	100%	9

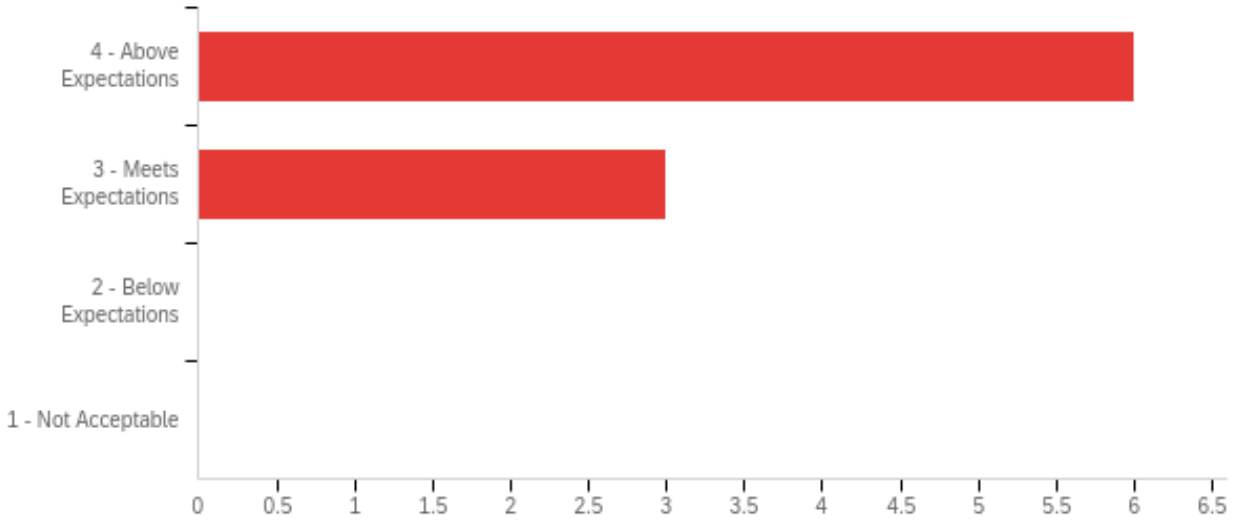
8 - Quality of English: good grammatical form, voice, tense, punctuation. Concise presentation



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Quality of English: good grammatical form, voice, tense, punctuation. Concise presentation	1.00	2.00	1.22	0.42	0.17	9

#	Answer	%	Count
1	4 - Above Expectations	77.78%	7
2	3 - Meets Expectations	22.22%	2
3	2 - Below Expectations	0.00%	0
4	1 - Not Acceptable	0.00%	0
	Total	100%	9

9 - Technical writing content: good organization; clear description of problem, state-of-the art, technical approach, and results; clear figures and tables; relevant and timely references



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Technical writing content: good organization; clear description of problem, state-of-the art, technical approach, and results; clear figures and tables; relevant and timely references	1.00	2.00	1.33	0.47	0.22	9

#	Answer	%	Count
1	4 - Above Expectations	66.67%	6
2	3 - Meets Expectations	33.33%	3
3	2 - Below Expectations	0.00%	0
4	1 - Not Acceptable	0.00%	0
	Total	100%	9

9. Interpreting Results

The aggregate data are summarized in the following table. The key takeaways from the assessment data are:

- The ratings of all the four SLOs in the master's degree program are "Exemplary".
- The 2022-2023 student performance has a marginal downgrade from the previous year.
- Among all the SLOs, our master's students deliver the best performance in terms of SLO 4.
- The CSSE faculty will have a detailed action plan to enhance the MS-CSSE SLO 3 in the next assessment cycle.

Direct Measurement Data Comparison between the current cycle (2022-2023) and the previous cycles (2019-2022)

MS-CSSE Program – Direct Measures	SLO 1	SLO 2	SLO 3	SLO 4
2022-2023 Final Scores	91.0	91.9	90.5	92.6
Ratings	Exemplary	Exemplary	Exemplary	Exemplary
2021-2022 Final Scores	92.9	95.5	94.6	94.4
Ratings	Exemplary	Exemplary	Exemplary	Exemplary
2020-2021 Final Scores	92.3	93.0	92.4	92.4
Ratings	Exemplary	Exemplary	Exemplary	Exemplary
2019-2020 Final Scores	90.5	91.1	89.4	86.6
Ratings	Exemplary	Exemplary	Proficient	Proficient

The final scores of all the four student learning outcomes (SLOs) are 90 or above. These SLO scores are 91.0, 91.9, 90.5, and 92.6, respectively. All the four SLO measures meet our expectations - meeting the exemplary level. Last year, the four SLO scores were 92.9, 95.5, 94.6, and 94.4, respectively. Our short-term goal is to lift the ratings of SLO 3 from 90.5 to 92.0.

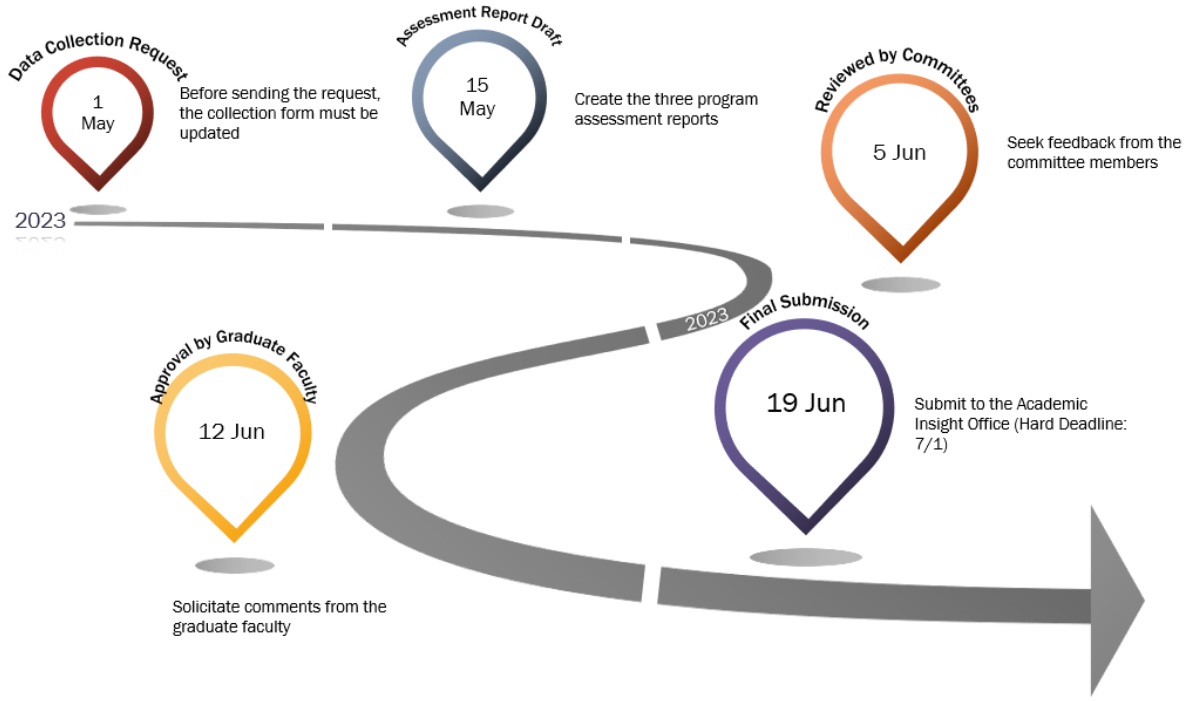
The assessment results signify that the CSSE faculty has enhanced the MS-CSSE students' reasoning and technical skills as well as communication skills. Among the four SLOs, our master's students deliver the best performance in terms of SLO 2 – the same trend is applicable for the previous assessment cycle (2020-2021). This assessment result unravels that MS-CSSE students exhibit strong skills to implement and test software solutions to problems.

In this assessment cycle, we also collected survey data from COMP 7990 thesis research. The results plotted in Section 8.2 on pages 8-16 reveal that MS-CSSE (thesis-option) students have outstanding communication skills in the context of software development and cutting-edge research. The results are consistent with those presented in Section 8.1

In a nutshell, we are thrilled to report that the 2022-2023 student performance has met the target level with respect to all the four SLOs.

10. Communicating Results

The program outcomes were shared with the CSSE faculty through an email announcement. The program outcomes have been posted on the CSSE graduate programs website in September 2020 after the 2019-2020 report was submitted. This latest annual assessment report was shared with the CSSE faculty members through the graduate faculty mailing list on Thursday, June 15, 2023, in the summer 2023 semester. After we incorporated the faculty's comments on this report, the assessment report is submitted to the Office of Academic Assessment. In additional, the assessment report was submitted to Dr. Fergus and Dr. Auad, the Associate Deans who oversee program assessment and graduate studies in the Samuel Ginn College of Engineering. The final version of this assessment report will be shared, distributed, and discussed during a faculty meeting scheduled in the first week of the fall 2023 semester.



The above infographic sketches the timeline of the entire assessment procedure, including data collection, data analysis, assessment report writing, graduate programs committee review, CSSE graduate faculty approval, and final report submission. The procedure starts at the beginning of May, and the annual assessment report is submitted in the third week of June.

A vast majority of the CSSE graduate faculty members participated in the assessment procedure such as data collection. The graduate programs committee thoroughly reviewed this report before the CSSE graduate faculty approved the assessment report. To facilitate efficient communication, we provide the graduate faculty with a summary of the key findings from the report.

The detailed milestones, deadlines, and description of each activity are tabulated in the table below.

CSSE Annual Graduate Program Assessment Timeline

MS in Computer Science and Software Engineering

Day Month

Date	Milestone Title	Deadline	Description or Activity
5/1/2023	Data Collection Request	5/15/2023	Before sending the request, the collection form must be updated
5/15/2023	Assessment Report Draft	6/5/2023	Create the three program assessment reports
6/5/2023	Reviewed by Committees	6/12/2023	Seek feedback from the committee members
6/12/2023	Approval by Graduate Faculty	6/19/2023	Solicitate comments from the graduate faculty
6/19/2023	Final Submission		Submit to the Academic Insight Office (Hard Deadline: 7/1)

Use of Results

11. Purposeful Reflection

11.1 A Consistent and Ongoing Process

The graduate programs committee consists of five professors: Dr. Biaz, Dr. Ku, Dr. Baskiyar, Dr. Kandah, and Dr. Qin, who are committee to arrange a minimum of three meetings per year to evaluate and improve the Ph.D. program. Please note that Dr. Umphress retired last year, and Dr. Kandah – the chair of the Cybersecurity curriculum committee in the CSSE Department – is a new member serving on the CSSE graduate programs committee. The recommendations made by the graduate programs committee will be further reviewed by the CSSE graduate faculty in the first faculty meeting scheduled in the fall 2023 semester. In some cases, departmental policies will be forged to streamline the management of the Ph.D. program and doctoral students. The graduate faculty always offers insightful feedback to the graduate programs committee to brush up on proposed policies and strategies. In case of disagreements occur among graduate faculty members, the department chair – Dr. Narayanan – will collaborate with Dr. Hendrix, associate chair of the department, to spearhead a resolution through tradeoffs for the disagreements.

11.2 Implementation of the Above Process

During the graduate programs committee meeting held on June 15, the committee members concurred that the SLO 3 measure is still noticeably lower than those of the other SLOs. The graduate programs committee proposed plan to focus on novel approaches to strengthening MS-CSSE students' reasoning and technical skills to solve problems in at least one area of research. By and large, the MS-CSSE program in Computer Science and Software Engineering is rated at the proficient level. The CSSE graduate faculty will continue improving both the curriculum as well as the opportunities for extracurricular activities. We look forward to future faculty development accompanied by the constructive and insightful feedback offered by the Office of Academic Insight on this graduate program assessment report.

11.3 COMP 7930 Directed Studies and COMP 7980 Capstone Projects

During the graduate programs committee meeting held on June 15, the committee members concurred that the SLO 3 measure is still noticeably below its peers. The data collected from COMP 6120, 7930, and 7980 were not available when we initially wrote the report containing the following assessment results. Surprisingly, after we incorporated the data gleaned from COMP 6120/7930/7980, all the SLO measures - especially SLO 2-3 measures - are immensely boosted from the proficient rating to the exemplary ones. We conclude that these three courses play a pivotal role in program assessment procedure. We will, in the future, ensure that assessment data is collected from these three important courses.

Direct measurement before incorporating the COMP 6120, 7930, 7980 data

Course Outcomes	SLO 1	SLO 2	SLO 3	SLO 4
Final Scores	90.9	88.1	85.3	87.1
Ratings	Exemplary	Proficient	Proficient	Proficient

Direct measurement after incorporating the COMP 6120, 7930, and 7980 data

Course Outcomes	SLO 1	SLO 2	SLO 3	SLO 4
Final Scores	91.0	91.9	90.5	92.6
Ratings	Exemplary	Exemplary	Exemplary	Exemplary

12. Action Plan

Action 1. In this assessment cycle, the data are manually collected by CSSE faculty members. It takes approximately a neighborhood of 20 to 30 minutes to harvest data for a course with an enrollment of 45. We opt to take this approach thanks to its simplicity. As an action item, we will pilot a way to make use of Canvas to align course components - assignments, quizzes, projects - to the graduate program SLOs – the direct measures will be automatically handled by Canvas to improve data collection efficiency.

It is practical to take full advantage of the Canvas system to automatically gauge assessment data. With regard to data collection, we have initiated a collaboration with Dr. Dorothy Thompson at the Academic Assessment Office to pilot an automatic way of gleaning data from the Canvas system. We had a kickoff meeting with Dr. Thompson on June 15. A second meeting with Dr. Thompson is scheduled in the first two weeks of the Fall'22 semester. A challenge to be addressed in the pilot study is how to deal with a common case where students from two or more graduate programs are taking the same graduate course managed by Canvas. This challenge is non-trivial because Canvas has no information about students' graduate programs. We will collaborate with Mr. Paul Springfield – the Canvas system administrator – to dig out a solution that streamlines the data collection process with automation.

Action 2. Next year, we aim to boost the student performance in terms of SLO 1 – "*Students will demonstrate proficiency of core knowledge in algorithms, computer architecture, and operating systems.*"

We are hopeful that SLO 1's overall score will be enhanced from 92.8 to 93.0. To achieve this goal, we will be focusing on a list of courses that emphasize SLO 1 in the curriculum map articulated in Section 4 on page 3. These courses include, but not limited to,

- COMP 6120 Database Systems I
- COMP 6130 Data Mining
- COMP 6360 Wireless and Mobile Networks
- COMP 6970 Special Topics: Game Design for Social Change
- COMP 6970 Special Topics: Cybersecurity Threats & Counter Measure
- COMP 6970 Special Topics: Security in Wireless Networks
- COMP 6970 Special Topics: iOS Development
- COMP 7270 Advanced Topics in Algorithms
- COMP 7300 Advanced Computer Architecture
- COMP 7370 Advanced Computer and Network Security
- COMP 7500 Advanced Topics in Operating Systems

Action 3. The graduate programs committee will work closely with Dr. Zhou – the instructor for COMP 6120 Database I – to pilot new approaches to strengthening the programming skills of master's students. Likewise, Dr. Qin, who regularly offer COMP 7500 Advanced Operating Systems, will take the following proposed strategies to cultivate the software development skills of master's students. We proposed the following ideas to bolster the student programming and software design skillsets.

- Offer multiple difficulty levels for programming projects.
- Allow student to pick their preferred programming languages.
- Assist students to find group members to develop collaborative course projects.
- Partner with the college's mentoring program to assign a mentor to COMP 6120 students

Action 4. We collected the assessment data from COMP 7990 Thesis Research, but COMP 7990 assessment data were not fully integrated in the aggregated SLO results presented on page 10. During the next assessment period, COMP 7990 data will be seamless incorporated to the SLO measures.

Action 5. Similar to the COMP 7990 case, COMP 7980 Capstone Engineering Project data have not yet been aggregated into the overall SLO measures. Next year, the graduate programs committee will collaborate with Mr. Lovelace – the Manager of the Academic Programs in our department – to report COMP 7980 assessment data that will be reflected in the final SLO results.