

SUNY at Fredonia
College of Arts & Sciences
Department of Computer and Information Sciences
Assessment Report, AY 2022-2023

Department Information	
Department	Computer and Information Sciences
Academic Programs	Computer Science; Computer Information Systems
Degrees	BS
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SUNY Fredonia Mission Statement: Fredonia educates, challenges, and inspires students to become skilled, connected, creative, and responsible global citizens and professionals. The university enriches the world through scholarship, artistic expression, community engagement, and entrepreneurship.

CIS Department Mission Statement: To provide state-of-the-art education to our students to excel in key fields of Computer and Information Sciences (CIS) and engage them in activities that enhance the welfare of Western New York and our society at large. Through student-centered education in an environment that fosters creative thinking and innovative problem-solving, we prepare our graduates for an assortment of career goals, including graduate studies. We view scholarly investigations and software development as an integral part of instruction, providing opportunities to students for active learning through practicum, research, and internship. Through active involvement in general education and interaction with cross-discipline course work, our programs embody students with life skills that help them become productive citizens and professionals.

The CIS department has adopted eleven student learning outcomes (SLOs) or Goals as per Academic Assessment Program Map of SUNY at Fredonia, which could be categorized into four Institutional Learning Goals (IGLs), i.e., (i) Skilled, (ii) Connected, (iii) Creative and (iv) Responsible. How these four IGLs are aligned with eleven SLOs, please refer to Table I on page # 3 & 4. This means that the assessment selection depends upon which CS/IS track is to be considered at the present time. Please keep in mind that for Information Systems (IS) track SLO 'K' is not valid. We have mapped these SLOs to the corresponding Campus Baccalaureate Goals. First, we display a list of the CIS department SLOs, and then we present our Program Educational Objectives (SLOs). We reiterate that the same list of SLOs from A through I is applicable to both CS and IS tracks. That is why SLO 'J' is occurring two times in the list of SLOs: the upper SLO is for CS track and the lower one belongs to IS track of the CIS Department.

The following list indicates the Student Learning Outcomes (SLOs/Goals) for the CIS Department:

- A. An ability to apply knowledge of computing and mathematics appropriate to the discipline.
- B. An ability to analyze a problem and identify and define the computing requirements appropriate to its solution.
- C. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- D. An ability to function effectively in teams to accomplish a common goal.
- E. An understanding of professional, ethical, legal, security and social issues and responsibilities.
- F. An ability to communicate effectively with a range of audiences.
- G. An ability to analyze the local and global impact of computing on individuals, organizations, and society.
- H. Recognition of the need for and an ability to engage in continuing professional development.
- I. An ability to use current techniques, skills, and tools necessary for computing practice.
- J. An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices. [CS]

[J] An understanding of and an ability to support the use, delivery, and management of information systems within an Information Systems environment.
[IS]
- K. An ability to apply design and development principles in the construction of software systems of varying complexity. [CS]

The SLOs/Goals 'A' through 'J' and 'K' for CS track are assessed based on the courses being taught in CIS Department during each fall and spring semester, and they correlate strongly with our three Program Educational Objectives, SLOs, which can be found in our former Assessment Reports. However, for the sake of clarity, we are once again listing these three SLOs here for our CIS Department:

- PEO1: Be prepared for a successful career in computer and information science or pursue graduate studies.
- PEO2: Utilize strong problem solving and communication skills.
- PEO3: Acquire life-long learning skills and engage in professional development.

Now, we are ready to depict the relationship between the SLOs and PEOs, and a similar relationship between SLOs and the campus baccalaureate goals. Table I shows mapping of SLOs to the corresponding SLOs. Just to point out here that each SLO from 'A' through 'K' is further subdivided into three to five categories or performance criteria (PC) depending on the complexity of algorithm or project work or oral presentation of the assigned work. In Table I, we present mapping of the CIS Department Goals/SLOs that correspond to the SUNY Fredonia campus's four baccalaureate goals: (1) Skilled, (2) Connected, (3) Creative and (4) Responsible.

Table I: Mapping of SLOs with corresponding SUNY Fredonia baccalaureate goals

Student Learning Outcomes/Goals (SLOs/Goals)	SUNY Fredonia Institutional Learning/Baccalaureate Goals (IGLs)			
	Skilled	Connected	Creative	Responsible
A: An ability to apply knowledge of computing and mathematics appropriate to the discipline	Students learn programming through a sequence of progressively difficult courses		Learn to be creative in developing algorithms and in modeling data	
B: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution	challenging the students in several courses to solve real-life problems on the computer by developing programs		Learn to be creative in developing algorithms for solving problems and in modeling data	
C: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs	Learning and using skills to design and implement a computer-based solution.			Make sure the program or solution meets the needs
D: An ability to function effectively on teams to accomplish a common goal		Students work in teams to complete a project and share their part of solution with others		Students meet deadlines for various reports
E: An understanding of professional, ethical, legal, security and social issues and responsibilities				Students get the knowledge of ethical and security issues in IT and computer industry.
F: An ability to communicate effectively with a range of audiences		In oral communication courses, students give presentations, handle Q & A and evaluate each other		Ability to command the topic and respond with various options to show thorough knowledge of the topic

G: An ability to analyze the local and global impact of computing on individuals, organizations, and society	Students are prepared to be global technological citizens, looking at issues facing other countries and cultures.			Students study examples of the impact of computing on global society.
H: Recognition of the need for and an ability to engage in continuing professional development		Through Internships, the students connect to each other and engage in continuous professional development		Students show a sense of responsibility by taking the professional internships seriously
I: An ability to use current techniques, skills, and tools necessary for computing practice.	In programming and web design courses, students need to use modern tools and be on top of the technology.		Students find creative ways of using current technique and skills.	
J: An understanding of processes that support the delivery and management of information systems within a specific application environment. [IS]	Students acquire appropriate skills on several topics in concerning information systems processes		Students create models that support delivery/management of information systems	
J: An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices. [CS]			Students do model and design computing systems in a variety of ways using creative options.	
K: An ability to apply design and development principles in the construction of software systems of varying complexity. [CS]	Students enhance their skills by designing software systems in a variety of languages and platforms.			

Dr. Singh and Dr. Zubairi have designed the curriculum map and assessment plan 2014 for Computer Science (CS) and Information Systems (IS) tracks, respectively. The curriculum map explains a mapping of the courses to one or more corresponding SLOs. In the assessment plan, several performance criteria (PC) have been developed for each SLO/Goal. In each fall and spring semester, the specific courses are identified that satisfy these performance criteria, and consequently are picked for the data collection that is used to create the final annual assessment report. For each Goal/SLO, a rubric is designed that depicts specific milestones to be achieved by the students to exceed or meet or approach a given standard. The rubric also identifies the limitations, which are demonstrated by those students who fail to meet a particular standard.

In the beginning of each fall and spring semester, the Assessment Coordinator (Dr. Singh) identifies the courses to be picked for assessment report and informs the instructors teaching those courses for which Goals/SLOs data collection is to be done. Instructors refer to the rubric sheets as a guideline to find out the specific

milestones for students to achieve. This prior information helps instructors to prepare and include specific questions in their quizzes, assignments, exams, and projects/presentations. Consequently, instructors design quizzes, exams, assignments, projects, and presentations in such a way that includes the relevant kind of work to be performed by the students. As the semester progresses, instructors are reminded periodically by the Assessment Coordinator about the collection of assessment data in a timely manner. Finally, at the end of each fall and spring semester, the instructors turn in the collected assessment data to the Assessment Chair (Dr. Singh). Based on the data collected by the instructors, the pertinent SLOs/Goals are assessed at the end of academic year. For fall 2022 and spring 2023 semesters, a list of courses to be assessed is presented in Tables II and III, respectively. Each Table lists the courses to be assessed, which is based on the curriculum map and the response obtained from the instructors teaching relevant course/courses in fall 2022 and spring 2023 semesters. It is observed from Table II that we did not offer CSIT321 course in fall 2022. However, the CSIT321 course were offered in spring 2023, and therefore, we performed a limited assessment analysis for SLOs, I3. The same conclusion may be drawn from three courses CSIT441, CSIT455 and CSIT462 for F1, F2, F3 and F4. These six courses (CSIT321, CSIT441, CSIT462, CSIT441, CSIT455 and CSIT462), are heightened in yellow color in Tables II and III. The main reason being that we could not offer several courses in fall 2022 and spring 2023 semesters that three tenure-track faculty resigned in fall 2020. In place of three tenure-track faculty members, we were allowed to hire only one tenure-track faculty member who joined the CIS department in fall 2022. Consequently, it has affected the course offerings in both fall 2022 and spring 2023 semesters. On top of it, one tenured faculty member was on sabbatical leave in fall 2022, and consequently it further hampered the course offerings both in fall 2022 and spring 2023 semesters. Additionally, one contingent CIS faculty member was offered a full-time job in a high school, and he also resigned just at the start of the fall 2022 semester. The situation of SLOs E1, E2, E3, G1 and G2, and I4 has improved since we offered CSIT201 and CSIT231 courses both in fall 2022 and spring 2023 semesters.

Table II: Information of each course, its instructor, and SLOs to be assessed for fall 2022.

S. No.	Course # & Instructor	Program Learning Outcomes (SLOs) To Be Assessed
1.	CSIT201: Cole	All Es, & G1, G2
2.	CSIT221: Arnavut	I1
3.	CSIT231: Szocki	I4
4.	CSIT241: Shahin Mehdi pour	A3
5.	CSIT311: Kropp	A4, I2
6.	CSIT321* (Not offered this Fall 2022)	I3
7.	CSIT324: Singh	A2, B3
8.	CSIT341: Haider	A1, A5, B2, & All Js
9.	CSIT425: Denise	B1, B4, and All Cs, Ds, Fs, & Ks
10.	CSIT431: Haider	All Fs
11.	CSIT441* (Not offered this Fall 2022)	All Fs
12.	CSIT455: Denise	All Fs
13.	CSIT462*: (Not offered this Fall 2022)	All Fs
14.	CSIT300, CSIT400, CSIT497, CSIT499: Arnavut, Denise, Haider, & Singh	Graduating Senior Exit Survey

Table II: Information of each course, its instructor, and SLOs to be assessed for fall 2022.

Serial No.	Course # & Instructor	Student Learning Outcomes (SLOs) To Be Assessed
1.	CSIT201: Zubairi	All Es, G1 & G2

2.	CSIT221: Arnavut & Haider	I1
3.	CSIT231: Szocki	I4
4.	CSIT241: Shahin	A3
5.	CSIT242: Shimanovich	A3
6.	CSIT311: Shimanovich	A4, I2
7.	CSIT321: Denise	I3
8.	CSIT324: Singh	A2, B3
9.	CSIT341: Haider	A1, A5, B2, & All Js
10.	CSIT425: Zubairi	B1, B4, and All Cs, Ds, Fs, & Ks
11.	CSIT431: Haider	All Fs
12.	CSIT441: (Not offered this Spring 2023)	All Fs
13.	CSIT455: (Not offered this Spring 2023)	All Fs
14.	CSIT462: (Not offered this Spring 2023)	All Fs
14.	CSIT300, CSIT400, CSIT496, CSIT497 & CSIT499: Arnavut, Denise, Shahin, & Zubairi	Graduating Senior Exit Survey

In the actual assessment analysis of a given course taught during fall 2022 and spring 2023 semesters, we now present a comprehensive discussion on how to analyze and assess each of SLOs/Goals from 'A' through 'K'. In the 1st row of Table IV displayed on page # 7, we present the statement of a given SLO/Goal to be assessed, followed by its Assessment Method in the 2nd row, its Data Source based on the courses offered in both fall and spring semesters in the 3rd row, and lastly the Assessment Results are presented in the 4th row. For example, for SLO/Goal, 'A', we first list its five Performance Criteria (PCs), e.g., A1, A2, A3, A4 & A5. For each PC, we assign an abbreviation that relates to its actual description. Then, an inset table is plugged into it for all the courses offered, and in the end, its corresponding PC is presented. This table contains the raw assessment data, which is then combined and aggregated to produce final-result for a given SLO/Goal that is being assessed. Each entry in an inset table contains a triplet, (x, y, z), corresponding to a given PC that indicates Exceeds Standard, Meets Standard, and Approaches Standard. Arithmetic means are used to combine and aggregate the results. At the end of computation, an actual number of students is used for calculating percentile performances. Arithmetic means are used instead of geometric means because for each PC, the range of values is the same, i.e., the total number of students in a class is normalized to the maximum number of students in a course offered for that SLO/Goal. Adding the PC values across multiple courses by columns still results in similar patterns, which preserve consistency of the actual results. For presenting the results in three categories, i.e., X (Exceeds), M (Meets) and I (Approaches/Insufficient), the following mathematical formulas are used to aggregate the percentile performances. Here, 'L' is the number of courses in which a given SLO is to be assessed and 'N' is the number of performance criteria for each SLO. Each PC's performance data is listed as a fractional number, p/q, where 'q' is the total number of students in the course and 'p' is the number of students that fulfills X or M or I category of performance. As an example, X/(X+M+I) would be the fraction of the number of students that exceeds a specific performance criterion (PC) in a course being taught. The following three mathematical equations are emSLOYed to determine X, M and I percentile performance, respectively:

$$X = 100 \times \sum_{j=1}^L \left[\left(100 \times \sum_{i=1}^n \frac{PCX_i}{N} \right) / L \right] \quad (1)$$

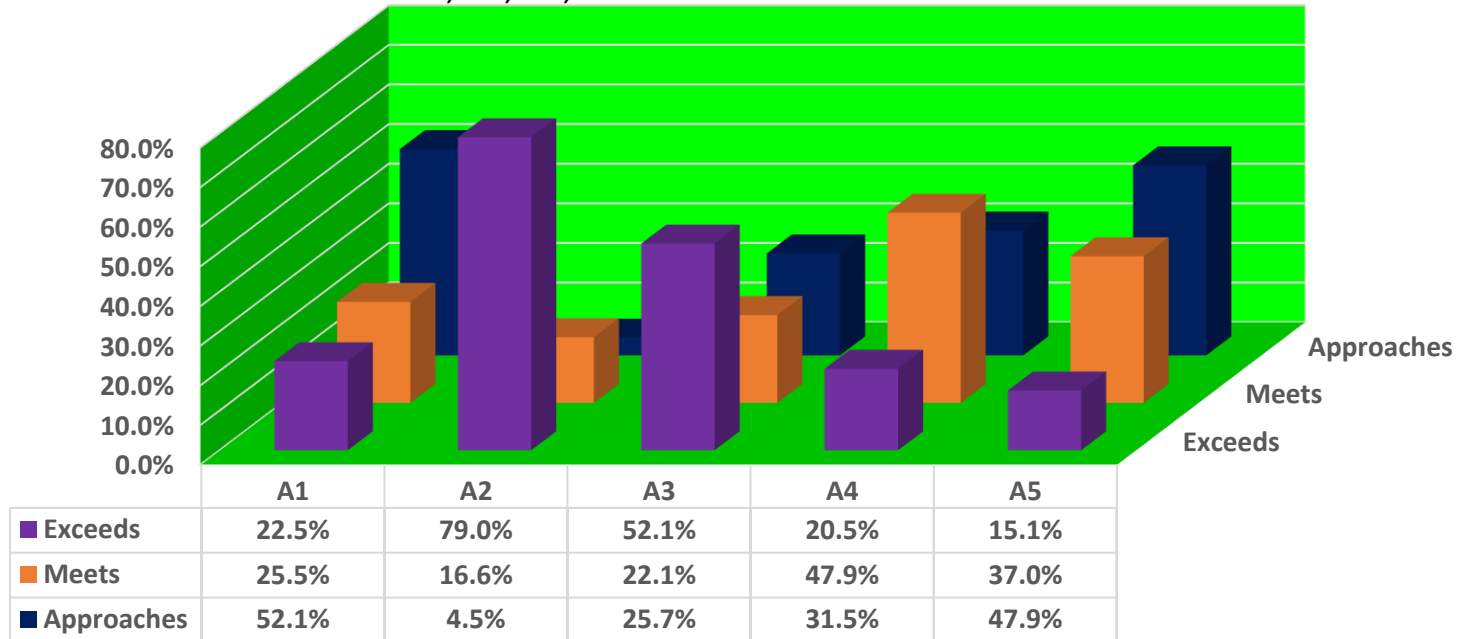
$$M = 100 \times \sum_{j=1}^L [(100 \times \sum_{i=1}^n \frac{PCM_i}{N})] / L \quad (2)$$

$$I = 100 \times \sum_{j=1}^L [(100 \times \sum_{i=1}^n \frac{PCI_i}{N})] / L \quad (3)$$

Table IV: Assessment of Student Learning Outcomes/Goals (SLOs/Goals)																																																					
Computer Science and Computer Information Systems																																																					
SLO/Goal A	An ability to apply knowledge of computing and mathematics appropriate to the discipline.																																																				
Assessment Method(s)	The first column of this table shows the CS course offered and its corresponding semester. F22 stands for fall 2022 and S23 is used for spring 2023 semester. Instructors assign program-based questions/projects to the student of five courses, CSIT241, CSIT242, CSI311, CSIT324, and CSIT341 during F22 and S23 semesters. The programs/projects are thoroughly reviewed and graded by the instructors. The instructors provide the Assessment Committee Chair with a graded portfolio of a given number of assignments/exam questions or project work. Instructors include in their instrument relevant exams questions, program/project work of CSIT241, CSIT242, CSIT324 and CSIT341 courses as per the assessment plan. Understanding of computer organization and architecture questions are included in the CSIT311 course offered in F22 and S23.																																																				
Data Source	Data source is based on the programs written by students depending on assigned work, which is then graded by instructors teaching these courses CSIT241, CSIT242, CSIT311 CSIT324, and CSIT341. Some specific exam questions could be picked from these listed courses too.																																																				
Assessment Results	<p>Following are the assessment results as per performance criteria A1, A2, A3, A4 and A5:</p> <p>Performance criteria</p> <p>A1. (DATA) Demonstrates an understanding of basic data structures and their representation.</p> <p>A2. (OOPL) Demonstrates an understanding of a high-level object-oriented programming language and software design.</p> <p>A3. (DIGITAL) Demonstrates an understanding of number systems and digital logic.</p> <p>A4. (ORGA) Demonstrates an understanding of computer organization and architecture.</p> <p>A5. (ALGM) Demonstrates an understanding of analysis of algorithms.</p> <p>Each triplet (x, y, z) indicates (exceeds, meets, insufficient or approaching)</p> <table border="1"> <thead> <tr> <th>Course Offered</th> <th>A1 (DATA)</th> <th>A2 (OBJECT)</th> <th>A3 (DIGITAL)</th> <th>A4 (ORGA)</th> <th>A5 (ALGM)</th> </tr> </thead> <tbody> <tr> <td>CSIT341 (F22)</td> <td>2, 5, 6</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>CSIT341 (S23)</td> <td>4, 2, 8</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>CSIT324 (F22)</td> <td>-</td> <td>10, 2, 1</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>CSIT324 (S23)</td> <td>-</td> <td>9, 2, 0</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>CSIT311 (F22)</td> <td>-</td> <td>-</td> <td>-</td> <td>3, 8, 5</td> <td>-</td> </tr> <tr> <td>CSIT311 (S23)</td> <td>-</td> <td>-</td> <td>-</td> <td>2, 2, 2</td> <td>-</td> </tr> <tr> <td>CSIT241 (F22)</td> <td>-</td> <td>-</td> <td>5, 2, 3</td> <td>-</td> <td>-</td> </tr> </tbody> </table>					Course Offered	A1 (DATA)	A2 (OBJECT)	A3 (DIGITAL)	A4 (ORGA)	A5 (ALGM)	CSIT341 (F22)	2, 5, 6	-	-	-	-	CSIT341 (S23)	4, 2, 8	-	-	-	-	CSIT324 (F22)	-	10, 2, 1	-	-	-	CSIT324 (S23)	-	9, 2, 0	-	-	-	CSIT311 (F22)	-	-	-	3, 8, 5	-	CSIT311 (S23)	-	-	-	2, 2, 2	-	CSIT241 (F22)	-	-	5, 2, 3	-	-
Course Offered	A1 (DATA)	A2 (OBJECT)	A3 (DIGITAL)	A4 (ORGA)	A5 (ALGM)																																																
CSIT341 (F22)	2, 5, 6	-	-	-	-																																																
CSIT341 (S23)	4, 2, 8	-	-	-	-																																																
CSIT324 (F22)	-	10, 2, 1	-	-	-																																																
CSIT324 (S23)	-	9, 2, 0	-	-	-																																																
CSIT311 (F22)	-	-	-	3, 8, 5	-																																																
CSIT311 (S23)	-	-	-	2, 2, 2	-																																																
CSIT241 (F22)	-	-	5, 2, 3	-	-																																																

CSIT241(S23)	-	-	5, 5, 4	-	-
CSIT242 (S23)	-	-	2, 3, 1	-	-
CSIT341 (F22)	-	-	-	-	1, 5, 7
CSIT341 (S23)	-	-	-	-	3, 5, 6

SLO: A1, A2, A3, A4 & A5 Percentile Performance



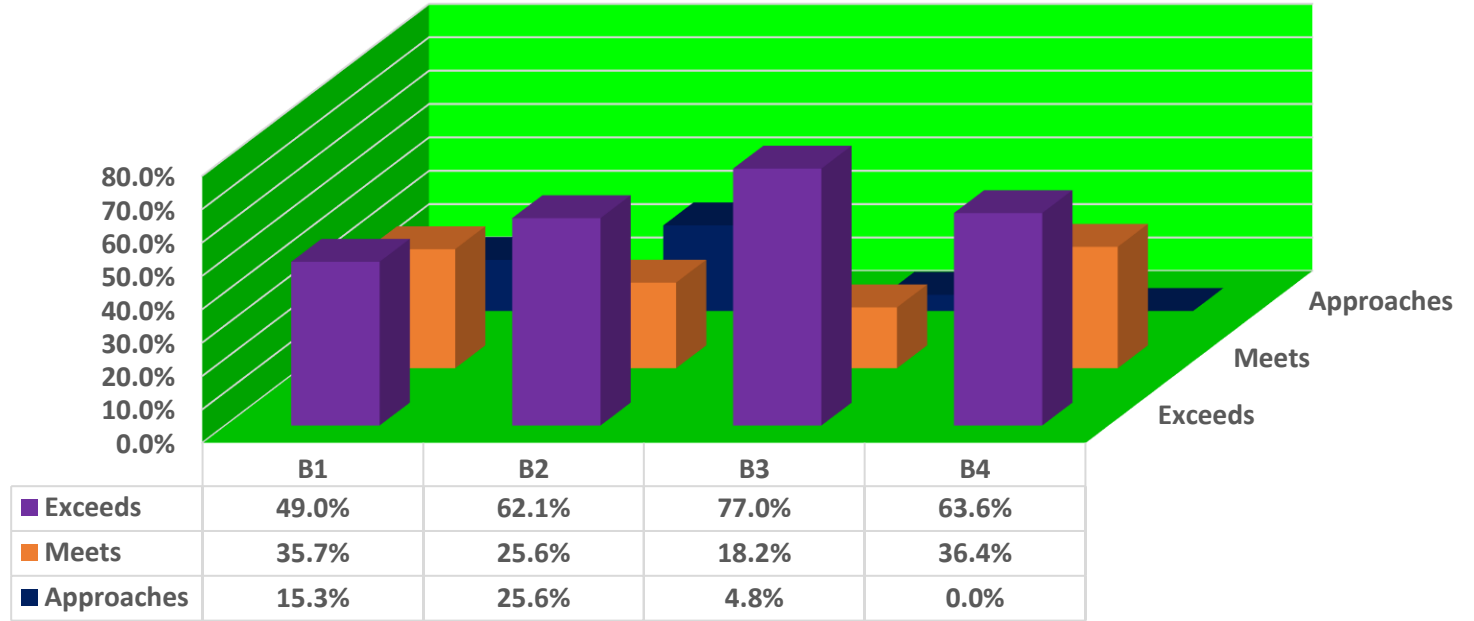
SLO/Goal B:	An ability to analyze a problem and identify and define the computing requirements appropriate to its solution.
Assessment Method(s)	Students are given programming assignments in which they analyze and solve a problem using appropriate paradigms and resources to arrive at its solution
Data Source	The data was collected by the Instructors of CSIT324, CSIT341 and CSIT425 in both fall 2022 and spring 2023 semesters. In CSIT425 course, data were collected by two different instructors using Final Project/Final Exam/assignments, whereas in CSIT341 data were collected on competency in analyzing some problems and proposing different models for its solution in fall 2022 and spring 2023 semesters. In CSIT324, data were collected using midterm and final online exams, and two lab projects assigned to the students. However, one instructor did not collect the data on B4 in S23 as the students were unable to complete the assigned group project work. Please see highlighted cell entry in the table for SLO, B4.
Assessment Results	Following are the assessment results as per performance criteria B1, B2, B3 and B4. Performance criteria B1. (SPEC) Demonstrates ability of writing program specifications and documentation.

B2. (ANALYZE) Demonstrates competency in analyzing the problem and proposing different models for solution.
 B3. (APPROPR) Demonstrates competency in analyzing models using appropriate paradigms and following standard practices.
 B4. (RESOURCES) Demonstrates competency in determining physical resources and the time required to come to a solution.

Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching).

Course Offered	B1 (SPEC)	B2 (ANALYZE)	B3 (APPROPR)	B4 (RESOURCES)
CSIT324 (F22)	-	-	9, 3, 1	-
CSIT324 (S23)	-	-	9, 1, 0	-
CSIT341 (F22)	-	3, 1, 1	-	-
CSIT341(S23)	-	7, 3, 3	-	-
CSIT425-01 (F22)	7, 4, 0	-	-	7, 4, 0
CSIT425-01 (S23)	0, 2, 4	-	-	No data

SLO: B1, B2, B3 & B4 Percentile Performance



SLO/Goal C:	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
Assessment Method(s)	Students are assigned lab projects to develop a computer-based system to meet the stated objectives.
Data Source	assigned to a team of 2-4 students for C1, C2, C3 and C4. The instrument used for C4 was based on Assignment 3. This instructor collected data on creation of documentation relating to the project work, The data for course CSIT425 was collected by the two instructors: one in F22 and the

other one in S23 semesters The data collection is based on Final Project communicating with team members, writing programs to conform to requirements and to meet deadlines in completion of project work. For the second instructor in S23., none was able to create a test plan for the project work for C4. Please see highlighted data cell entry in the table shown below.

Assessment Results

Following are the assessment results as per performance criteria C1, C2, C3, C4 and C5.

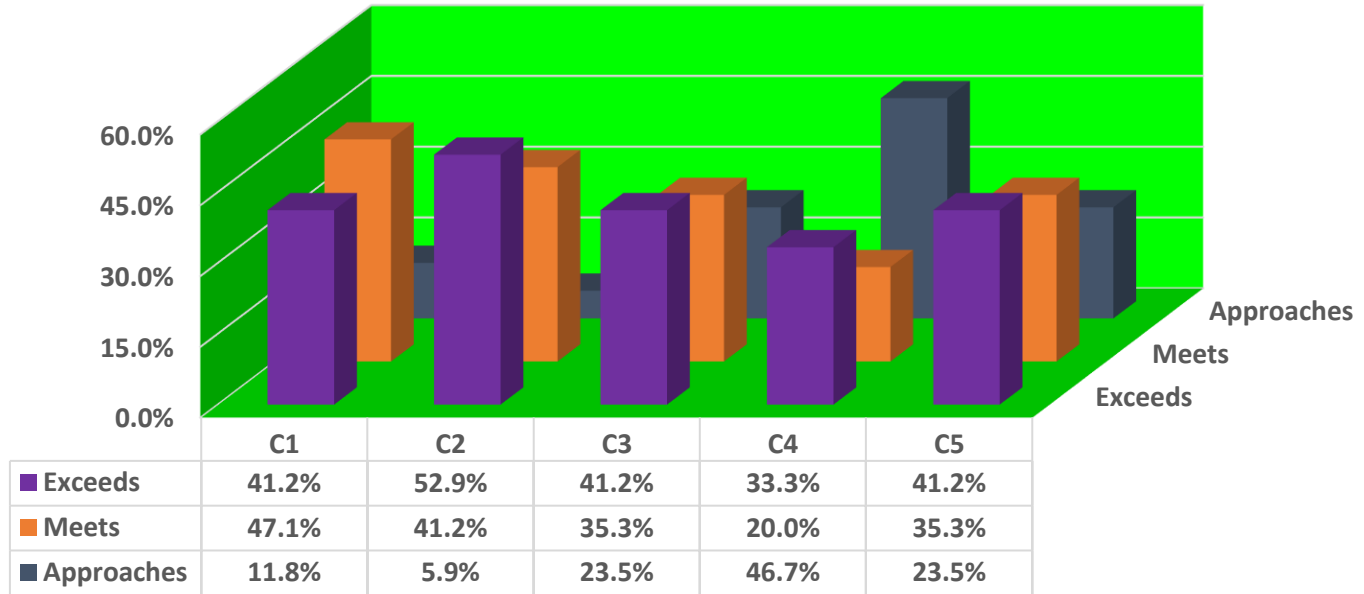
Performance criteria

- C1. (DESIGN) Demonstrates competency in computer-based system design.
- C2. (REQ) Demonstrates ability in eliciting requirements.
- C3. (METRIC) Demonstrates competency in developing project metrics.
- C4. (TEST) Demonstrates competency in creating and executing test plans.
- C5. (OPTIM) Demonstrates competency in comparing alternative solutions and selecting the optimal one.

Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching).

Course Offered	C1 (DESIGN)	C2 (REQ)	C3 (METRIC)	C4 (TEST)	C5 (OPTIM)
CSIT425-01 (F22)	7, 4, 0	7, 4, 0	7, 4, 0	5, 3, 1	7, 4, 0
CSIT425-01 (S23)	0, 4, 2	2, 3, 1	0, 2, 4	0, 0, 6	0, 2, 4

SLO: C1, C2, C3, C4 and C5 Percentile Performance

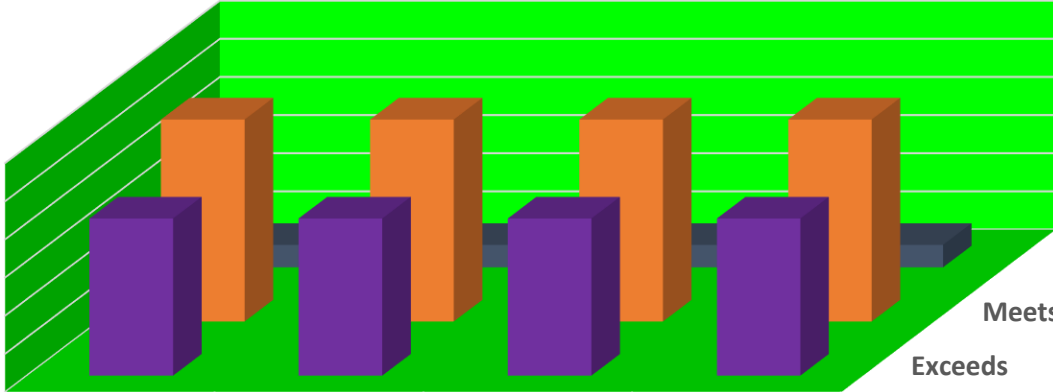


SLO/Goal D:

An ability to function effectively on teams to accomplish a common goal.

Assessment Method(s)

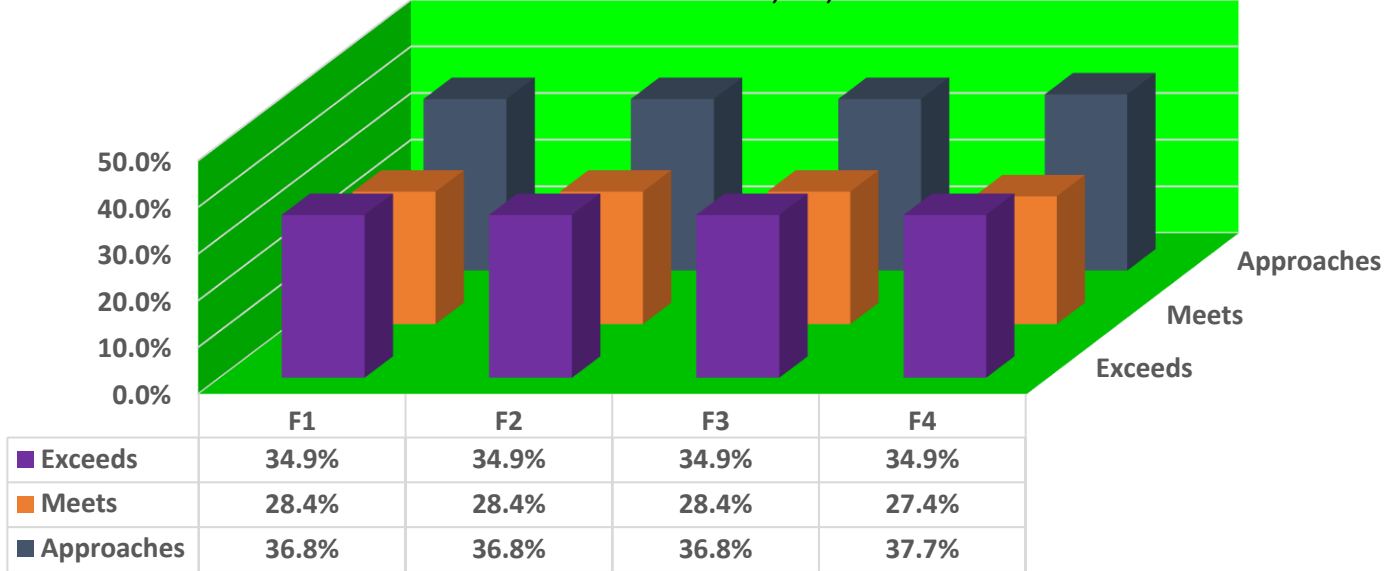
Done through project portfolio and peer evaluations.

Data Source	The data for course CSIT425 was collected by two different instructors: one in fall 2022 and the other one in spring 2023 semester. The data collection is based on Final Project assigned to a team of 2/3/4 students for D1, D2, D3 and D4. Both instructors collected data on creation of documentation relating to the project work, communicating with team members, writing programs to conform to requirements and to meet deadlines in completion of project work. All groups completed the project work in fall 2022 and spring 2023 semesters.																																			
Assessment Results	<p>Following are the assessment results as per performance criteria D1, D2, D3 and D4.</p> <p>Performance criteria D1. (DOCU) Demonstrates ability to document well the work. D2. (INTER) Demonstrates ability to communicate with team members, listen actively, provide feedback, and share information. D3. (VALID) Demonstrates the ability to validate research on an assigned relational database systems topic using empirical evidence to support claims. D4. (DEAD) Demonstrates ability to meet deadlines.</p> <p>Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching).</p> <table border="1" data-bbox="464 630 1495 727"> <thead> <tr> <th>Course Offered</th> <th>D1 (DOCU)</th> <th>D2 (INTER)</th> <th>D3 (VALID)</th> <th>D4 (DEAD)</th> </tr> </thead> <tbody> <tr> <td>CSIT425-01 (F22)</td> <td>7, 4, 0</td> <td>7, 4, 0</td> <td>7, 4, 0</td> <td>7, 4, 0</td> </tr> <tr> <td>CSIT425-01 (S23)</td> <td>0, 5, 1</td> <td>0, 5, 1</td> <td>0, 5, 1</td> <td>0, 5, 1</td> </tr> </tbody> </table> <div data-bbox="464 732 1986 1352"> <p style="text-align: center;">SLO D: Percentile Performance of D1, D2, D3 and D4</p>  <table border="1" data-bbox="541 1182 1562 1352"> <thead> <tr> <th></th> <th>D1</th> <th>D2</th> <th>D3</th> <th>D4</th> </tr> </thead> <tbody> <tr> <td>Exceeds</td> <td>41.2%</td> <td>41.2%</td> <td>41.2%</td> <td>41.2%</td> </tr> <tr> <td>Meets</td> <td>52.9%</td> <td>52.9%</td> <td>52.9%</td> <td>52.9%</td> </tr> <tr> <td>Approaches</td> <td>5.9%</td> <td>5.9%</td> <td>5.9%</td> <td>5.9%</td> </tr> </tbody> </table> </div>	Course Offered	D1 (DOCU)	D2 (INTER)	D3 (VALID)	D4 (DEAD)	CSIT425-01 (F22)	7, 4, 0	7, 4, 0	7, 4, 0	7, 4, 0	CSIT425-01 (S23)	0, 5, 1	0, 5, 1	0, 5, 1	0, 5, 1		D1	D2	D3	D4	Exceeds	41.2%	41.2%	41.2%	41.2%	Meets	52.9%	52.9%	52.9%	52.9%	Approaches	5.9%	5.9%	5.9%	5.9%
Course Offered	D1 (DOCU)	D2 (INTER)	D3 (VALID)	D4 (DEAD)																																
CSIT425-01 (F22)	7, 4, 0	7, 4, 0	7, 4, 0	7, 4, 0																																
CSIT425-01 (S23)	0, 5, 1	0, 5, 1	0, 5, 1	0, 5, 1																																
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Meets	52.9%	52.9%	52.9%	52.9%																																
Approaches	5.9%	5.9%	5.9%	5.9%																																
SLO/Goal E:	An understanding of professional, ethical, legal, security and social issues and responsibilities.																																			

Assessment Method(s)	Specific questions are included in the assignments and tests for assessing this goal. Instructor teaching this course collects assessment data and forwards it to the assessment Committee Chair.																												
Data Source	The data collection for E goal is done for CSIT201 course taught in fall 2022 and spring 2023 semesters. At the end of F22 (around week 13), the one instructor gave the students a SLO exam. The exam asked the students to write brief essays on each of the SLO's topics. The second instructor teaching this course in spring 2023 collected the data based on authentication, making strong passwords, identity management and identifying all types of malwares and protecting computer against malware attacks.																												
Assessment Results	<p>Following are the assessment results as per performance criteria E1, E2 and E3.</p> <p>Performance Criteria E1. (ETHIC) Understands the ethical issues related to technology. E2. (SECUR) Understands the security issues and problems of identity theft. E3. (MAL) Demonstrates knowledge about the characteristics of different malware types and the difference between them.</p> <p>Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching).</p> <table border="1"> <thead> <tr> <th>Course Offered</th> <th>E1 (ETHIC)</th> <th>E2 (SECUR)</th> <th>E3 (MAL)</th> </tr> </thead> <tbody> <tr> <td>CSIT201 (F22)</td> <td>13, 0, 0</td> <td>12, 1, 0</td> <td>13, 0, 0</td> </tr> <tr> <td>CSIT201 (S23)</td> <td>15, 5, 3</td> <td>15, 5, 3</td> <td>20, 3, 0</td> </tr> </tbody> </table> <p style="text-align: center;">SLO E: Percentile Performance of E1, E2, and E3</p> <table border="1"> <thead> <tr> <th></th> <th>E1</th> <th>E2</th> <th>E3</th> </tr> </thead> <tbody> <tr> <td>Exceeds</td> <td>77.8%</td> <td>75.0%</td> <td>91.7%</td> </tr> <tr> <td>Meets</td> <td>13.9%</td> <td>16.7%</td> <td>8.3%</td> </tr> <tr> <td>Approaches</td> <td>8.3%</td> <td>8.3%</td> <td>0.0%</td> </tr> </tbody> </table>	Course Offered	E1 (ETHIC)	E2 (SECUR)	E3 (MAL)	CSIT201 (F22)	13, 0, 0	12, 1, 0	13, 0, 0	CSIT201 (S23)	15, 5, 3	15, 5, 3	20, 3, 0		E1	E2	E3	Exceeds	77.8%	75.0%	91.7%	Meets	13.9%	16.7%	8.3%	Approaches	8.3%	8.3%	0.0%
Course Offered	E1 (ETHIC)	E2 (SECUR)	E3 (MAL)																										
CSIT201 (F22)	13, 0, 0	12, 1, 0	13, 0, 0																										
CSIT201 (S23)	15, 5, 3	15, 5, 3	20, 3, 0																										
	E1	E2	E3																										
Exceeds	77.8%	75.0%	91.7%																										
Meets	13.9%	16.7%	8.3%																										
Approaches	8.3%	8.3%	0.0%																										

SLO/Goal F:	An ability to communicate effectively with a range of audiences.																																																					
Assessment Method(s)	In oral communication courses, class is divided into several groups of three/four students depending on the complexity of assigned project. Each group presents their project work during class time in the last four/five weeks of the course work. Each group presentation is evaluated by their peers as well as by the instructor. Instructor collects assessment data and forwards it to the assessment Committee Chair.																																																					
Data Source	<p>The data collection was done by two instructors: one offering two courses (CSIT425 and CSIT455), and the other one offering one course (CSIT431) in fall 2022 semester, whereas two Instructors offered two courses (CSIT425, and CSIT431) in spring 2023. However, one course (CSIT455) was not offered in spring 2023 semester and two courses (CSIT441 & CSIT462), were not offered in both fall 2022 and spring 2023 semesters. This non-offering discrepancy is attributed to the shortage of instructors in the department since three tenure-track instructors resigned. Data presented here is collected on Final Project, Categories 2, 4 & 5. Items 1-5 of student presentations, which is a measure of good verbal skills and interaction with other students, good control on power point slides, well organization of talk, and covering the topic completely.</p> <p>The method of data collection may vary depending on the choice of each instructor since three instructors are involved in teaching these five courses: three courses in fall 2022 and two courses in spring 2023 semester. We may mention here that we did not offer CSIT441 and CSIT462 in fall 2022 and spring 2023 semesters. There is another issue involving course offering of CSIT441 and CSIT462 in both fall 2022 and spring 2023 semester that we did not have qualified instructors to teach these courses. Consequently, we were unable to perform any data analysis of all Fs on two courses, CSIT441 and CSIT462 offered in F22 and S23 semesters. Remedy to such like problem is that our department needs more resources specially to teach speech intensive 400 level courses like CSIT441 and CSIT462 in future course offerings.</p>																																																					
Assessment Results	<p>Following are the assessment results as per performance criteria (PC) F1, F2, F3 and F4.</p> <p>Performance criteria F1. (VERBAL) Demonstrates an ability of good verbal skills. F2. (PRESENT) Demonstrates good knowledge of presentation software. F3. (ORGN) Demonstrates an ability of good organization of the talk. F4. (KNOW) Demonstrates knowledge of the topic.</p> <p>Each triplet (x, y, z) indicates (exceeds, meets, insufficient or approaching).</p> <table border="1"> <thead> <tr> <th>Course Offered</th> <th>F1 (VERBAL)</th> <th>F2 (PRESENT)</th> <th>F3 (ORGN)</th> <th>F4 (KNOW)</th> </tr> </thead> <tbody> <tr> <td>CSIT425 (F22) Presentation</td> <td>6, 3, 2</td> <td>6, 3, 2</td> <td>6, 3, 2</td> <td>6, 3, 2</td> </tr> <tr> <td>CSIT425 (F22) Assignment 3</td> <td>5, 1, 5</td> <td>5, 1, 5</td> <td>5, 1, 5</td> <td>5, 1, 5</td> </tr> <tr> <td>CSIT425 (S23)</td> <td>1, 4, 1</td> <td>1, 4, 1</td> <td>1, 4, 1</td> <td>1, 4, 1</td> </tr> <tr> <td>CSIT431 (F22)</td> <td>2, 6, 10</td> <td>2, 6, 10</td> <td>2, 6, 10</td> <td>2, 6, 10</td> </tr> <tr> <td>CSIT431 (S23)</td> <td>2, 0, 1</td> <td>2, 0, 1</td> <td>2, 0, 1</td> <td>2, 0, 1</td> </tr> <tr> <td>CSIT441 (F22 & S23)</td> <td colspan="4">Not offered in fall 2022 & spring 2023</td> </tr> <tr> <td>CSIT455 (F22)</td> <td>8, 4, 3</td> <td>8, 4, 3</td> <td>8, 4, 3</td> <td>8, 4, 3</td> </tr> <tr> <td>CSIT455 (S23)</td> <td colspan="4">Not offered spring 2023</td> </tr> <tr> <td>CSIT462 (F22 & S23)</td> <td colspan="4">Not offered in fall 2022 & spring 2023</td> </tr> </tbody> </table>				Course Offered	F1 (VERBAL)	F2 (PRESENT)	F3 (ORGN)	F4 (KNOW)	CSIT425 (F22) Presentation	6, 3, 2	6, 3, 2	6, 3, 2	6, 3, 2	CSIT425 (F22) Assignment 3	5, 1, 5	5, 1, 5	5, 1, 5	5, 1, 5	CSIT425 (S23)	1, 4, 1	1, 4, 1	1, 4, 1	1, 4, 1	CSIT431 (F22)	2, 6, 10	2, 6, 10	2, 6, 10	2, 6, 10	CSIT431 (S23)	2, 0, 1	2, 0, 1	2, 0, 1	2, 0, 1	CSIT441 (F22 & S23)	Not offered in fall 2022 & spring 2023				CSIT455 (F22)	8, 4, 3	8, 4, 3	8, 4, 3	8, 4, 3	CSIT455 (S23)	Not offered spring 2023				CSIT462 (F22 & S23)	Not offered in fall 2022 & spring 2023			
Course Offered	F1 (VERBAL)	F2 (PRESENT)	F3 (ORGN)	F4 (KNOW)																																																		
CSIT425 (F22) Presentation	6, 3, 2	6, 3, 2	6, 3, 2	6, 3, 2																																																		
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CSIT425 (S23)	1, 4, 1	1, 4, 1	1, 4, 1	1, 4, 1																																																		
CSIT431 (F22)	2, 6, 10	2, 6, 10	2, 6, 10	2, 6, 10																																																		
CSIT431 (S23)	2, 0, 1	2, 0, 1	2, 0, 1	2, 0, 1																																																		
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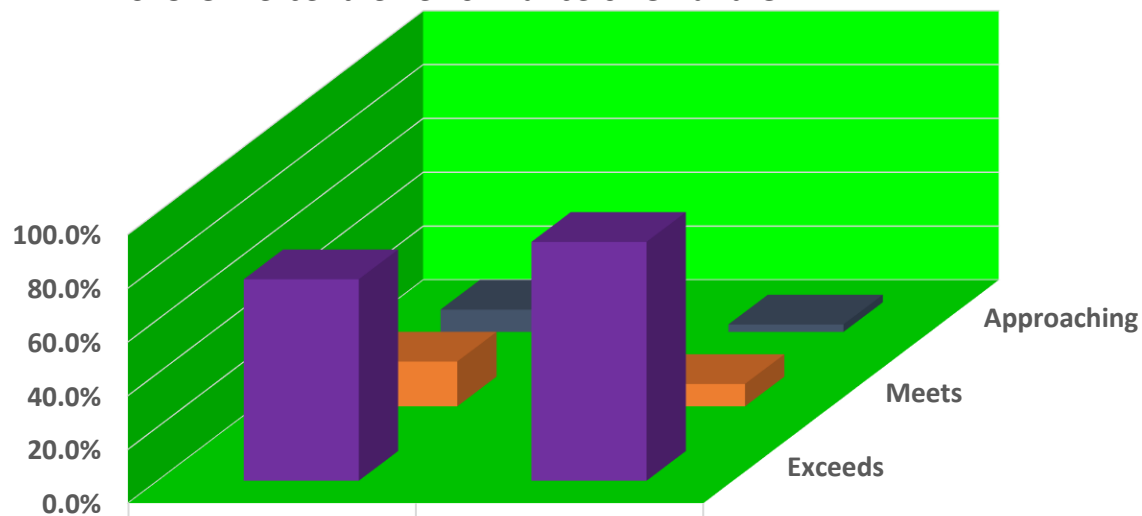
SLO F: Percentile Performance of F1, F2, F3 and F4



SLO/Goal G:	An ability to analyze the local and global impact of computing on individuals, organizations, and society.
Assessment Method(s)	Selected questions extracted from course examinations and assignments; selected components of course projects.
Data Source	The data was collected for CSIT201 course taught by two instructors: one in Fall 2022 and the other one in spring 2023 semesters. Therefore, data analysis on SLO or goal G could be performed and reported in current assessment report is for both semesters. One instructor used the following instrument to collect his data in fall 2022. : At the end of the semester, e.g., around week 13, the instructor gave the students a SLO exam that was designed specifically for testing SLOs G1 and G2. The exam asked the students to write brief essays on each of the SLO topics, e.g., G1 and G2. The other instructor who taught this course in spring 2023 picked topics from full chapters 6 and 13 for SLOs, G1 and G2.
Assessment Results	<p>Following are the assessment results as per performance criteria G1 and G2.</p> <p>Performance Criteria G1. (IMPACT) Demonstrates an ability to analyze the local and global impact of computing on individuals. G2. (SOCIETY) Demonstrates an ability to analyze the local and global impact of computing organizations and society.</p> <p>Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching) percentile performance of each SLO.</p>

Course Offered	G1 (IMPACT)	G2 (SOCIETY)
CSIT201 (F22)	12, 1, 0	13, 0, 0
CSIT201 (S23)	15, 5, 3	19, 3, 1

SLO G: Percentile Performance of G1 and G2



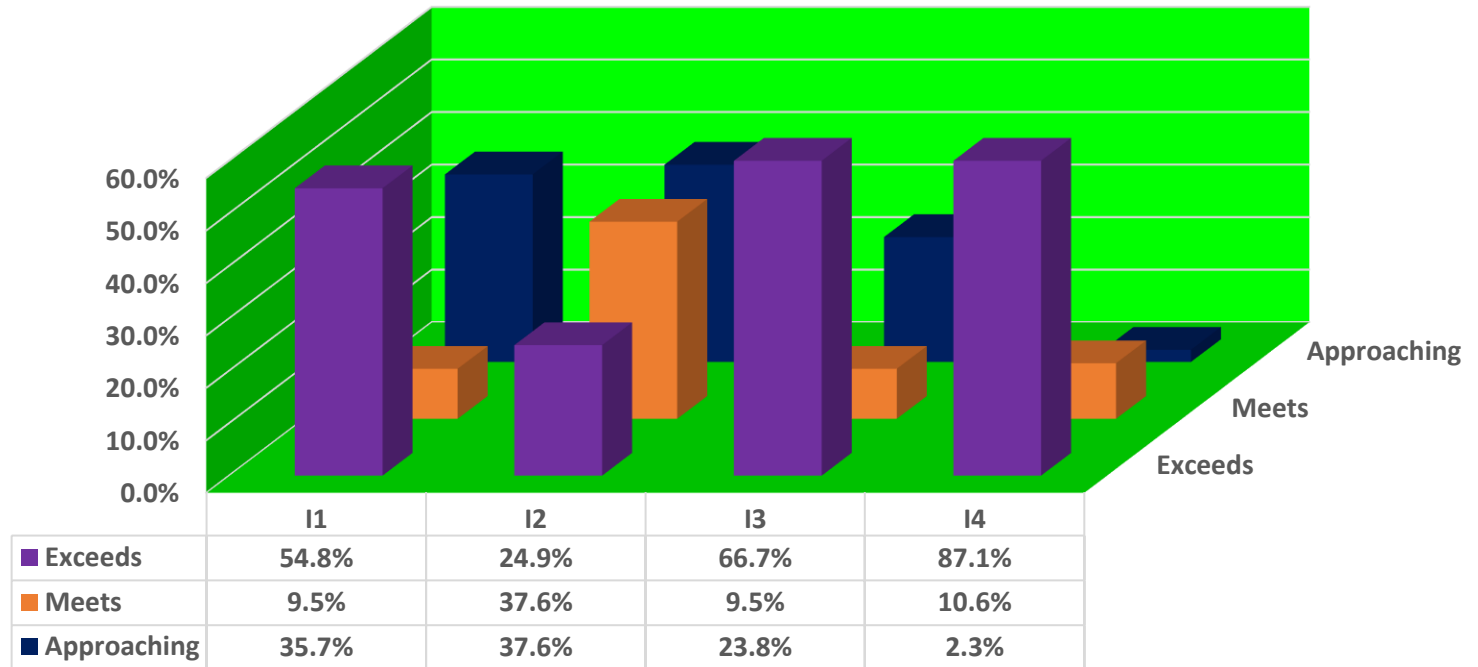
	G1	G2
Exceeds	75.0%	88.9%
Meets	16.7%	8.3%
Approaching	8.3%	2.8%

SLO/Goal I:	An ability to use current techniques, skills, and tools necessary for computing practice.
Assessment Method(s)	Selected questions extracted from course examinations and assignments; selected components of course projects.
Data Source	Eight courses were picked for the data collection in F22 and S23 semesters. The data was collected by six Instructors offering CSIT221 course: one section in fall 2022 and two sections in spring 2023 for SLO I1. Two sections of CSIT231 course was used to collect data for I2: one section in fall 2022 and another section in spring 2023. The data collection is done with C++ using MS VB.NET, Bash/C on Linux server and another computing language (Java, C#) for the three respective courses. Two sections of CSIT311 course were offered - one in fall 2022 and the other one in spring 2023, and therefore, data was collected on Assembly Language for Goal/SLO, I2. One section of CSIT321 offered in spring 2023 was used for data collection of Goal I3. Once again, data analysis of I3 is limited since we were unable to offer CSIT321 in both fall 2022 and spring 2023 semesters.
Assessment Results	Following are the assessment results as per performance criteria I1, I2 I3 and I4. Performance Criteria I1. (C++) Demonstrates competency in C++ programming.

I2. (ASSEMB) Demonstrates competency in assembly language programming.
 I3. (OTHER) Demonstrates competency in programming in other languages.
 I4. (UNIX) Demonstrates competency in the use of the UNIX operating system.
 Each triplet (x, y, z) indicates (exceeds, meets, insufficient or approaching).

Course Offered	I1 (C++)	I2 (ASSEMB)	I3 (OTH)	I4 (LINUX)
CSIT221 (F22)	11, 0, 5	-	-	-
CSIT221-01 (S23)	10, 0, 3	-	-	-
CSIT221-02 (S23)	5, 4, 8	-	-	-
CSIT231 (F22)		-		8, 1, 0
CSIT231 (S23)	-	-	-	9, 1, 0
CSIT311 (F22)	-	3, 5, 5	-	-
CSIT311 (S23)	-	2, 2, 2	-	-
CSIT321 (F22)			Not offered	
CSIT321 (S23)	-	-	14, 2, 5	-

SLO: I1, I2, I3 & I4 Percentile Performance



SLO/Goal J:	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.																																			
Assessment Method(s)	Selected questions extracted from course examinations and assignments; selected components of course projects.																																			
Data Source	The data was collected by just one Instructor offering the same CSIT341 course in fall 2022 and spring 2023 semesters. The instructor picked the data from assigned homework and programming problems as well as from some exam questions.																																			
Assessment Results	<p>Following are the assessment results as per performance criteria J1, J2, J3 and J4.</p> <p>Performance Criteria J1. (MODEL) Demonstrates an ability to apply mathematical modeling to computing problems. J2. (ALGM) Demonstrates an ability to develop different algorithms for a computing problem. J3. (EFFIC) Demonstrates an ability to evaluate algorithm efficiency. J4. (MEMORY) Understands the tradeoff between memory and running time.</p> <p>Each triplet (x, y, z) indicates (exceeds, meets, insufficient or approaching).</p> <table border="1"> <thead> <tr> <th>Course Offered</th> <th>J1 (MODEL)</th> <th>J2 (ALGM)</th> <th>J3 (EFFIC)</th> <th>J4 (MEMORY)</th> </tr> </thead> <tbody> <tr> <td>CSIT341 (F22)</td> <td>1, 5, 7</td> <td>2, 5, 6</td> <td>2, 3, 8</td> <td>1, 5, 7</td> </tr> <tr> <td>CSIT341 (S23)</td> <td>3, 5, 6</td> <td>4, 2, 8</td> <td>2, 6, 6</td> <td>3, 5, 6</td> </tr> </tbody> </table> <p style="text-align: center;">SLO: J1, J2, J3 and J4 Percentile Performance</p> <table border="1"> <thead> <tr> <th></th> <th>J1</th> <th>J2</th> <th>J3</th> <th>J4</th> </tr> </thead> <tbody> <tr> <td>Exceeds</td> <td>15.1%</td> <td>22.5%</td> <td>14.8%</td> <td>15.1%</td> </tr> <tr> <td>Meets</td> <td>37.0%</td> <td>25.5%</td> <td>33.7%</td> <td>37.0%</td> </tr> <tr> <td>Approaches</td> <td>47.9%</td> <td>52.1%</td> <td>51.5%</td> <td>47.9%</td> </tr> </tbody> </table>	Course Offered	J1 (MODEL)	J2 (ALGM)	J3 (EFFIC)	J4 (MEMORY)	CSIT341 (F22)	1, 5, 7	2, 5, 6	2, 3, 8	1, 5, 7	CSIT341 (S23)	3, 5, 6	4, 2, 8	2, 6, 6	3, 5, 6		J1	J2	J3	J4	Exceeds	15.1%	22.5%	14.8%	15.1%	Meets	37.0%	25.5%	33.7%	37.0%	Approaches	47.9%	52.1%	51.5%	47.9%
Course Offered	J1 (MODEL)	J2 (ALGM)	J3 (EFFIC)	J4 (MEMORY)																																
CSIT341 (F22)	1, 5, 7	2, 5, 6	2, 3, 8	1, 5, 7																																
CSIT341 (S23)	3, 5, 6	4, 2, 8	2, 6, 6	3, 5, 6																																
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Approaches	47.9%	52.1%	51.5%	47.9%																																

SLO/Goal K:	An ability to apply design and development principles in the construction of software systems of varying complexity.																																			
Assessment Method(s)	Based on project portfolio.																																			
Data Source	The data was collected by the two Instructors offering one section of CSIT425 course in fall 2022 semester, and another section by a different instructor of the same course in spring 2023 semester. Both instructors picked the instruments to achieve this goal K from Group Project's functional and non-functional requirements, deliverables and milestones, project plan, and group project's total points awarded. No data was collected on K2 by instructor teaching the course in spring 2023. Thus, the data analysis for K2 is limited and is based on the data supplied by the instructor teaching this course in fall 2022.																																			
Assessment Results	<p>Following are the assessment results as per performance criteria K1 through K4.</p> <p>Performance Criteria</p> <p>K1. (FORMAL) Demonstrates an ability to formally describe a software system.</p> <p>K2. (ESTIM) Ability to establish estimates.</p> <p>K3. (PLAN) Able to develop a project plan.</p> <p>K4. (DOCU) Able to provide adequate internal and external documentation.</p> <p>Each triplet (x, y, z) indicates (exceeds, meets, insufficient or approaching).</p> <table border="1"> <thead> <tr> <th>Course Offered</th> <th>K1 (FORMAL)</th> <th>K2 (ESTIM)</th> <th>(K3 PLAN)</th> <th>K4 (DOCU)</th> </tr> </thead> <tbody> <tr> <td>CSIT425-01 (F22)</td> <td>7, 4, 0</td> <td>7, 4, 0</td> <td>7, 4, 0</td> <td>7, 4, 0</td> </tr> <tr> <td>CSIT425-01 (S23)</td> <td>3, , 1</td> <td>-</td> <td>2, 3, 1</td> <td>2, 3, 1</td> </tr> </tbody> </table> <p style="text-align: center;">SLO: K1, K2, K3 and K4 Percentile Performance</p> <table border="1"> <thead> <tr> <th></th> <th>K1</th> <th>K2</th> <th>K3</th> <th>K4</th> </tr> </thead> <tbody> <tr> <td>Exceeds</td> <td>60.5%</td> <td>63.6%</td> <td>56.7%</td> <td>56.7%</td> </tr> <tr> <td>Meets</td> <td>35.7%</td> <td>36.4%</td> <td>39.5%</td> <td>39.5%</td> </tr> <tr> <td>Approaches</td> <td>3.8%</td> <td>0.0%</td> <td>3.8%</td> <td>3.8%</td> </tr> </tbody> </table>	Course Offered	K1 (FORMAL)	K2 (ESTIM)	(K3 PLAN)	K4 (DOCU)	CSIT425-01 (F22)	7, 4, 0	7, 4, 0	7, 4, 0	7, 4, 0	CSIT425-01 (S23)	3, , 1	-	2, 3, 1	2, 3, 1		K1	K2	K3	K4	Exceeds	60.5%	63.6%	56.7%	56.7%	Meets	35.7%	36.4%	39.5%	39.5%	Approaches	3.8%	0.0%	3.8%	3.8%
Course Offered	K1 (FORMAL)	K2 (ESTIM)	(K3 PLAN)	K4 (DOCU)																																
CSIT425-01 (F22)	7, 4, 0	7, 4, 0	7, 4, 0	7, 4, 0																																
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Meets	35.7%	36.4%	39.5%	39.5%																																
Approaches	3.8%	0.0%	3.8%	3.8%																																

SLO/Goal H:	Recognition of the need for and an ability to engage in continuing professional development.																																				
Assessment Method(s)	Senior students graduating in fall 2022, and spring 2023 semesters were requested to fill out senior exit survey before/on a deadline date set by the department. This anonymous senior exit survey was sent to the students three/four weeks before the end of a given semester. The student's responses of senior exit survey would help us out to refine the CIS curriculum, and consequently, to refine the assessment report during its future data collection and analysis work. A hard copy of the senior exit survey is also attached in Appendix I. In fall 2022, and spring 2023 semesters, the assessment coordinator requested the department secretary to invite the CIS graduating senior students to fill out an online senior exit survey in Google Form. The assessment coordinator also frequently reminded the department secretary if she sent it out to the graduating senior students to participate in the online exit survey at the end of both fall and spring semesters.																																				
Assessment Results	<p>The data collected by the department secretary is forwarded to the Department Acting Chair/Chair and Assessment Coordinator (Dr. Singh). Table V given below lists some salient features of the results of this assessment report based on the senior graduating students exit surveys conducted in fall 2022 and spring 2023 semesters. Total number of students graduated in fall 2022, and spring 2023 semesters is 34, which includes the number of 3 seniors who graduated in CIS majors in fall 2022 and 7 students in spring 2023 semesters. Among 34 graduating seniors, 24 students graduated in Computer Science (CS) and the remaining 10 senior students graduated in Information Systems (IS). It is interesting to note that none of the senior graduating students majoring in CIS participated in the senior exit survey in fall 2022, although the percentage of senior students graduating in both CS & IS majors is almost 26%. On the other hand, only 9 senior graduating students participated in the senior exit survey in spring of 2023 although the number of students graduating in spring 2023 semesters was 25. Out of 25 students, 18 students majored in CS, and the remaining 7 students majored in IS in spring 2023 semester. In spring 2023 semester, the senior student's participation is exactly 36%, which is not a bad number. The overall senior student participation both in fall 2022, and spring 2023 semesters is 34%. Due to lack of data available in fall 2022, we are unable report the number of semesters spent by the senior students to graduate from the CIS department in fall 2022 semester. However, senior students graduating in spring 2023 semester and who participated in the senior exit survey could graduate in the CIS major after spending 8 – 10 semesters at Fredonia University. Unfortunately, we did not have the data on the number of transferred graduating senior students and the number of their credits transferred in fall 2022, and spring 2023 semesters. Therefore, those numbers are not presented in Table V. The number of credits earned by the senior students who participated in the senior exit survey is over 90 at Fredonia University. Positive and negative feedback from two senior students who participated in the spring 2023 senior graduating exit survey will be discussed below in the conclusions section on next page # 20.</p> <p>Table V: A list of CS and CIS Senior Graduating Students in fall 2022, J-Term 2022 and spring 2023 semesters</p> <table border="1"> <thead> <tr> <th></th> <th>Total # of Majors</th> <th>CS Majors</th> <th>IS Majors</th> <th>Senior Survey Participation</th> <th>Percentile of Senior Survey Participation</th> <th>Transfer students</th> <th>Number of Semesters</th> <th>Number of Credits Earned</th> </tr> </thead> <tbody> <tr> <td>Fall 2022</td> <td>9</td> <td>6</td> <td>3</td> <td>0</td> <td>0 %</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Spring 2023</td> <td>25</td> <td>18</td> <td>7</td> <td>9</td> <td>36 %</td> <td>2</td> <td>8 - 10</td> <td>Over 90</td> </tr> <tr> <td>Grand Total</td> <td>34</td> <td>24</td> <td>10</td> <td>9</td> <td>36%</td> <td>2</td> <td>8 -10</td> <td>Over 90</td> </tr> </tbody> </table>		Total # of Majors	CS Majors	IS Majors	Senior Survey Participation	Percentile of Senior Survey Participation	Transfer students	Number of Semesters	Number of Credits Earned	Fall 2022	9	6	3	0	0 %	-	-	-	Spring 2023	25	18	7	9	36 %	2	8 - 10	Over 90	Grand Total	34	24	10	9	36%	2	8 -10	Over 90
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Conclusions																																					

<p>Have you had an opportunity to discuss these results within your department? If so, what form did this take?</p>	<p>The results reported here have been compiled after spending a lot of time and effort on the part of Dr. Singh in reminding the CIS faculty periodically throughout the fall 2022 and spring 2023 semesters and providing them with a tailor-made rubric for recording the assessment data in case any of the instructors teaching the fall 2022 and spring 2023 course is required. All instructors teaching fall 2022 and spring 2023 semester's courses did send their assessment data in a timely manner. As done before in the annual Assessment Report for the AY 2021-2022, I implemented a lower limit on to the percentile performance of a given SLO/Goal to 70%. If any course offered in fall 2022 and spring 2023 semesters has a percentile performance below 70%, it becomes mandatory to reexamine that course's SLO/Goal in future assessment analysis, which will help us to close the loop. If we implement this percentile performance criteria to all the courses offered in fall 2022 and spring 2023 semesters, we find that four courses, CSIT221, CSIT311, CSIT341 and CSIT425 require special attention to improve their percentile performance. Therefore, we list here four courses along with their SLOs/Goals to be reexamined in the future data collection and analysis work: CSIT221 (I1), CSIT311 (A4, I2), CSIT341 (A1, A5, J1, J2, J3, J4) and CSIT425 (B4, C4, F1, F2, F3, F4). I would request the Department Acting Chair/Coordinator to include an agenda item in the first faculty meeting to be held during beginning of Fall 2023 semester so-as-to take relevant measures to enhance the quality of collected data especially for CSIT221, CSIT311, CSIT341 and CSIT425 courses to be taught by their respective instructors (excluding the data of one instructor who taught CSIT221 course in fall 2022 and spring 2023 semesters - since for his two CSIT221 courses, the results were satisfactory) in the coming fall 2023 and spring 2024 semesters. Therefore, special attention must be focused on to SLOs/Goals as listed in parentheses of above mentioned for courses that were taught in fall 2022 and spring 2023 semesters.</p>
<p>What conclusions were drawn about student learning as a result of the assessment efforts?</p>	<p>The present assessment report represents a systematic study of compiled results of assessment data collected for eleven Goals or SLOs: A, B, C, D, E, F, G, H, I, J and K during fall 2022 and spring 2023 semesters. As reported in my former assessment reports that Eq. (1, 2 & 3) listed on page # 6-7 have been rewritten elegantly in mathematical form by Dr. Singh. Additionally, for the past several years, Dr. Singh had been collecting the assessment raw data from all the instructors teaching relevant courses in each fall and spring semester. The raw data processing and its analysis work are accomplished using the latest version of MS Excel 365 software, and the conclusions of the analysis work are presented in this assessment report. All Instructors have cooperated and sent out their assessment data in a timely manner in both fall 2022 as well as spring 2023 semesters. We believe that the assessment of eleven SLOs/Goals in two semesters is itself a great achievement. Additionally, Dr. Singh being a full-time continent faculty in the CIS department has an exceptionally large amount of teaching/service load.</p> <p>There is an important issue involving upper-level course offerings such as CSIT441 and CSIT462 courses in fall 2022 and spring 2023 semesters. The reason being that we did not have qualified instructors to teach speech intensive, upper-level courses in the computer science department. Thus, we were unable to include the results of data collection and analysis of SLOs F1, F2, F3 and F4 for the two courses, namely CSIT441 and CSIT462, in the current report. Consequently, we were unable to perform a comprehensive analysis of SLOs F1, F2, F3 and F4 based on our limited data collection effort. The remedy to such an existing problem is that our department needs more resources specially to hire new tenure-track faculty members to teach speech intensive, upper-level courses in future course offerings. The CIS department cannot afford to postpone and depend upon the part-time contingent faculty to teach such important upper-level courses.</p> <p>The results of assessment data analysis are presented in tabular/graphical forms in the assessment report at the appropriate places. If we combine the percentile performance of two categories: Meets and Exceeds Standard, our results are satisfactory for almost all the eleven Goals/SLOs investigated in the current study except for the following four courses : CSIT221 (I1), CSIT311 (A4, I2), CSIT341 (A1, A5, J1, J2, J3, J4), and, CSIT425 (B4, C4, F1, F2, F3, F4), where all SLOs/Goals A1, A5, B4, C4, F1, F2, F3, F4, I1, I2, J1, J2, J3 and J4 fall below 70%, but particularly for Goal A1, J1, and J4 for CST341, the percentile performance is less than 50%. We may mention here that for all J's of CSIT341 course taught in fall 2022 and spring 2023, the situation has deteriorated in comparison to the results obtained in Assessment Report of the AY 2021-22. For example, the</p>

percentile performance of four SLOs J1 (52%), J2 (48%), J3 (59%) and J4 (52%) for CSIT341 taught in fall 2022 and spring 2023 semester is still below 70%, which needs further attention in the coming fall and spring semesters. The courses for which we obtain percentile performance that is above 70%, we do not need any further improvement in the future data collection. However, there are number of courses where we require considerable improvement in the future data collection, e.g. SLOs A1, A5, J1, J2, J3, J4 for CSIT341, B4, C4, F1, F2, F3, F4 for CSIT425, I1 for CSIT221, A4 & I2 for CSIT311 and Goals A1, A5, J1, J2, J3, J4 for CSIT341 course offerings. Therefore, more data collection is necessary to improve our results in the future data collection of the above cited four courses offered in fall 2022 and maybe in spring 2023 semester. Thus, we conclude that at least for four courses, more data collection is clearly required to improve upon the percentile performance of several SLOs as listed above, which is a necessary step to be taken to close the loop. I may request the department acting chair/coordinator to include this important issue concerning the assessment report in the agenda of the first faculty meeting to be held in the coming fall 2023 semester.

At the end of this assessment report, we now present the results of the responses of CIS senior students who graduated in fall 2022 and spring 2023 semesters, which is done through their participation in the Google online senior exit survey. Unfortunately, none of the graduating senior students participated in the fall 2022 senior exit survey and nine students participated in the spring 2023 senior exit survey. When asked to rate their level of satisfaction with the CIS Department on a scale of 0 to 5, all nine graduating senior students responded to Senior Exit Survey and gave an overall score of 3.25/5, which is better than the average score 3.0 and is not so bad considering the current situation that majority the CIS faculty is contingent. The good news is that among nine senior students who participated in the online exit survey, three students have a job offer. However, to further enhance department rating, Fredonia University must allocate more resources to the CIS department. Six senior students took independent study/senior project course CSIT300, CSIT499 and CSIT497 and only one senior graduating student presented her/his work in the local conference. Senior students who got a job offer listed the following very useful upper-level courses offered in the CIS Department: Software Engineering (CSIT425), Object Oriented Programming (CSIT324), Data Communication (CSIT435), and Software Projects (CSIT496). I believe senior graduating who took these upper-level courses were very instrumental in getting the job offers. Two senior students indicated to join the graduate school in near future and do majoring in software engineering and software development. When asked to list five courses you liked the most at Fredonia, the answer was Computer Security and Ethics (CSIT201), CSIT203, System Programming (CSIT231), Computer Game Design and Implementation (CSIT308), Paradigms of Programming Languages (CSIT321), Data Structures (CSIT341), Software Engineering (CSIT425), Data Communications (CSIT435), Intro AI/Knowledge Engineering (CSIT461), Intro DIP/Computer Vision (CSIT463), and SpTp: Software Projects (CSIT496). This shows that most of the upper-level courses offered in CIS department are liked by our senior graduating students – another measure of good quality teaching work done by the department faculty. However, some lower and upper-level courses such as Computer Security and Ethics (CSIT201), CSIT203, System Programming (CSIT231), Computer Game Design and Implementation (CSIT308), Paradigms of Programming Languages (CSIT321) and SpTp: Software Projects (CSIT496), are offered in the CIS department were taught by contingent faculty, which indicates that contingent faculty has almost equal contribution of imparting good quality teaching to the senior students as well. Of course, lower-level courses are the foundation of upper-level courses.

When we talk about the accessibility of faculty offices and classrooms in the CIS Department, the average rating in fall 2022 and spring 2023 semesters is 3.63/5, which appears to be exceedingly good. But when asked about the access to workspace and equipment for their course work in the CIS Department, graduating seniors gave the average rating of 3.25/5 in spring 2023 semester, which is once again above the average score. When asked to list the activities or courses that helped the students most to understand the need to remain current in their discipline, the answer is:

	<p>Working on real-world applications in senior projects, tying theory to real-world examples, group homework and projects, upper-level course like Software Engineering (CSIT425), Introduction to Operating Systems (CSIT431), Paradigms of Programming Languages (CSIT321), Introduction Digital Image Processing (DIP)/Computer Vision (CSIT463) and time spent with CIS professors.</p> <p>Here are some positive points cited by five senior students, who participated in the senior exit survey, in a sample of nine students about the CIS Department and its faculty and the other four senior students did not comment at all:</p> <ol style="list-style-type: none"> 1. I enjoyed getting to take a wide variety of classes. 2. Knowledge 3. None 4. N/A 5. N/A <p>Here are some adverse remarks made by three senior students about the CIS Department and the other senior student did not comment or commented none or N/A:</p> <ol style="list-style-type: none"> 1. Wish there was more structure going through the Computer Science Program. I think it would be beneficial to make a concrete structure of skills that students should have come out of school. Specifically, concentrating on one programming language to teach fundamentals on. My previous school used Java for all the core classes to teach fundamentals and had electives that introduced other languages and implemented them. 1. I wish there were more opportunities for labs being accessible over weekends. 2. There is a discernable difference on this campus between Professors and even between the same class taught by different Professors, in my honest opinion I feel if I had not gotten the right Professors at the right time I would have had far more struggles than I already did. 3. None 4. N/A

Appendix-I



State University of New York at Fredonia
Department of Computer and Information Sciences
2154 Fenton Hall (716) 673-4820

RUBRIC SHEET FOR ASSESSMENT OF PROGRAM OUTCOME H

Recognition of the need for and an ability to engage in continuing professional development

GRADUATING SENIORS EXIT SURVEY

Please check the appropriate entry, or choose the most suitable option, or fill the blanks for each of the question given below where possible.

Date: _____

1. You earned your B.S. degree in

- Computer Science _____ Advanced Computing Track / _____ Software Development Track/ _____ General Track
- Computer Information Systems _____ Systems Development/ _____ System Management
- Another major, but I got a minor in _____ Computer Science/ _____ Computer Information Systems

2. a. Year started at SUNY Fredonia _____ Year graduated _____

b. Did you change your major? Yes _____ No _____

If Yes:

c. What was your previous major? _____

d. Did you transfer from another college to SUNY Fredonia? Yes _____ No _____

If Yes:

e. How many credit hours did you transfer?

Less than 30 _____ Between 30 and 60 _____ Between 60 and 75 _____ Over 75 _____

f. How many semesters overall you spent at college (at SUNY Fredonia and the college your transferred from)? _____

3. On a scale of 6 to 1 (with 6 being Excellent and 1 being very poor): How satisfied are you with your education at the Department of Computer and Information Sciences in SUNY Fredonia?

4. Did you participate in any independent study or group project?

- Yes b. No

5. Did take any of the courses (circle what is appropriate):

-
- CSIT 499 Project,
- CSIT 497 Thesis,
- HONR 400 Thesis,
- CSIT 400 Independent Study,
- CSIT 300 Internship.

6. Did you attend any conferences, workshops, seminars to broaden knowledge and skills?

- Yes b. No

7. Do you already have a job offer?

- Yes b. No

If yes, is it related to your major?

- Yes b. No

8. Do you plan to attend graduate school?

- Yes, already accepted into graduate school; Field: _____
- Yes, applying now; Field: _____
- Yes, in the future
- No

9. List five courses you liked the most at Fredonia

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

10. If you have a job offer, list four courses that were most beneficial to you in securing the job.

- a. _____
- b. _____
- c. _____
- d. _____

11. If you had the option to take more elective choices in the discipline, what topic areas would you have liked to have taken at SUNY Fredonia?

- _____

- _____
- _____
- _____

12. How accessible do you feel faculty offices and classrooms were?
(inaccessible) 1 2 3 4 5 (very accessible)

13. Do you think the access you had to workspace and equipment were sufficient for your coursework
(disagree) 1 2 3 4 5 (agree)

14. What activities or courses helped you most to understand the need to maintain currency in the discipline

15. List what technology-related skills, if any, you have learned outside classes at SUNY Fredonia

16. Do you have a positive remark/comment(s) to share?

17. Do you have a negative remark/comment(s) to share?
