

SUNY Fredonia
College of Arts & Sciences
Department of Computer and Information Sciences
Assessment Report, AY 2019-2020

Department Information	
Department	Computer and Information Sciences
Academic Programs	Computer Science; Computer Information Systems
Degrees	BS
Contact Person <i>(This should be the person coordinating/reporting on the department's assessment efforts)</i>	
Name	Gurmukh Singh
Title	Senior Lecturer & Kasling Award Winner 2007
E-Mail Address	gurmukh.singh@fredonia.edu
Extension	4734
Name	
Title	
E-Mail Address	
Extension	

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 program learning outcomes (PLOs) or Goals as per Academic Assessment Program Map of SUNY at Fredonia, which could be categorized into four Institutional Learning Goals (IGLs), i.e., Skilled, Connected, Creative and Responsible (Please refer to Table I on page # 3 & 4). This 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, PLO 'K' is invalid. We have mapped these PLOs to the corresponding Campus Baccalaureate Goals. A list of the CIS department PLOs is displayed initially and then our Program Educational Objectives (PEOs) are presented. We reiterate that the same list of PLOs from A through I is applicable to both CS and IS tracks. That is why PLO 'J' is occurring two times in the list of PLOs: the upper PLO is for CS track and the lower one is for IS track of the CIS Department.

The following list indicates the Program Learning Outcomes (PLOs/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 on 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 PLOs/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 PEOs, which could be found in our former Assessment Reports. However, for the sake of clarity, we are listing them here too. These are three Program Educational Objectives (PEOs) for our CIS Department: (i) PEO1: Be prepared for successful career in computer and information science or pursue graduate studies. (ii) PEO2: Utilize strong problem solving and communication skills. (iii) PEO3: Acquire life-long learning skills and engage in professional development. Following is a depiction of the relationship between the PEOs and PLOs, and PLOs to the campus baccalaureate goals as prepared by Dr. Zubairi. Table I shows mapping of PEOs to the corresponding PLOs. Just to point out here that each PLO 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 CS Department Goals/PLOs that correspond to the SUNY Fredonia campus four baccalaureate goals: (1) Skilled, (2) Connected, (3) Creative and (4) Responsible.

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

Program Learning Outcomes/Goals (PLOs/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 created the curriculum map and assessment plan 2014 for Computer Science (CS) and Information Systems (IS) tracks, respectively. The curriculum map shows a mapping of the courses to one or more corresponding PLOs. In the assessment plan, several of performance criteria (PC) has been developed for each PLO/Goal. In each fall and spring semester, the specific courses are identified that satisfy these performance criteria, and consequently are

picked for assessment in each semester. For each Goal/PLO, a rubric sheet is designed that depicts specific milestones to be achieved by the students to meet or exceed or approach a given standard. The rubric sheet also identifies the shortcomings, which are demonstrated by those students who fail to meet the standard.

In the beginning of each fall and spring semester, the Assessment Coordinator identifies the courses to be picked for assessment work and informs the Instructors teaching those courses for which Goals/PLOs data collection is to be done. Instructors refer to the rubric sheets as a guideline to figure out the specific milestones for students to be achieved. This prior information helps the Instructors to prepare and include specific questions in their course quizzes, assignments, examinations (exams) and projects/presentations. Consequently, instructors design exams, assignments, projects, and presentations that include the relevant kind of work to be performed by the students. As the semester progresses, the 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. Based on the data collected, the pertinent PLOs/Goals are assessed. In fall 2019 and spring 2020 semesters, a list of courses to be assessed is depicted in Table II and Table III, respectively. Each Table lists the courses to be assessed, which is based on the curriculum map and the response gotten from the Instructors teaching relevant courses in fall 2019 and spring 2020 semester. It is worthwhile to mention here that we did not offer CSIT321 course in fall 2019 and CSIT311 course this spring 2020 and therefore, we are able to perform the limited assessment analysis for PLOs A4, I2 and I3 in the present assessment report. These two courses, CSIT321 and CSIT311 are highlighted in yellow color in Tables II and III.

Table II: Information of each course, its instructor, and PLOs to be assessed for fall 2019

S. No.	Course # & Instructor	Program Learning Outcomes (PLOs) To Be Assessed
1.	CSIT201: Cole	All Es, & G1, G2
2.	CSIT221: Denise	I1
3.	CSIT224: Singh	A2, B3
4.	CSIT231: Szocki	I4
5.	CSIT241 & CSIT242: Maloney	A3
6.	CSIT311: Zubairi	A2, I2
7.	CSIT321 (Not offered this Fall 2019)	I3
8.	CSIT341: Kropp	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 2019)	All Fs
12.	CSIT455: Rieks	All Fs
13.	CSIT462: Zubairi	All Fs
14.	CSIT300, CSIT400, CSIT497 & CSIT499: Zubairi	Graduating Senior Exit Survey

Table III: Information of each course, its instructor, and PLOs to be assessed for spring 2020

S. No.	Course # & Instructor	Program Learning Outcomes (PLOs) To Be Assessed
1.	CSIT201: Zubairi	All Es, & G1, G2
2.	CSIT221: Arnavut & Haider	I1

3.	CSIT224: Singh	A2, B3
4.	CSIT231: Singh & Szocki	I4
5.	CSIT241 & CSIT242: Maloney	A3
6.	CSIT311: (Not offered this Spring 2020)	A4, I2
7.	CSIT321: Denise	I3
8.	CSIT341: Kropp	A1, A5, B2, & All Js
9.	CSIT425: Denise & Zubairi	B1, B4, and All Cs, Ds, Fs, & Ks
10.	CSIT431: Haider	All Fs
11.	CSIT441: Arnavut	All Fs
12.	CSIT455: Rieks	All Fs
13.	CSIT462: (Not offered this Spring 2020)	All Fs
14.	CSIT300, CSIT400, CSIT497 & CSIT499: Denise, Pratt, Singh & Zubairi	Graduating Senior Exit Survey

In the actual assessment analysis of a given course taught during fall 2019 and spring 2020 semesters, we will present a comprehensive discussion on how each PLO/Goal, A through K, is being assessed. In a Table IV displayed on next page, we present the statement of a given PLO/Goal to be assessed in 1st row, followed by its Assessment Method in 2nd row, its Data Source in 3rd row and Assessment Results in the last row. For example, for PLO/Goal, 'A', we first list its five Performance Criteria (PC), e.g., A1, A2, A3, A4 & A5. For each PC, we represent an abbreviation that relates to its actual description. Then, an inset table is inserted in which for each course, its corresponding PC is presented. This table contains the raw assessment data, which is then combined and aggregated to produce final-result for a PLO/Goal that is being assessed. Each entry in this inset table contains a triplet, (x, y, z), 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 PLO/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 PLO is to be assessed and 'N' is the number of performance criteria for each PLO. 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 obvious 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 employed to determine X, M and I percentile performance, respectively:

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

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

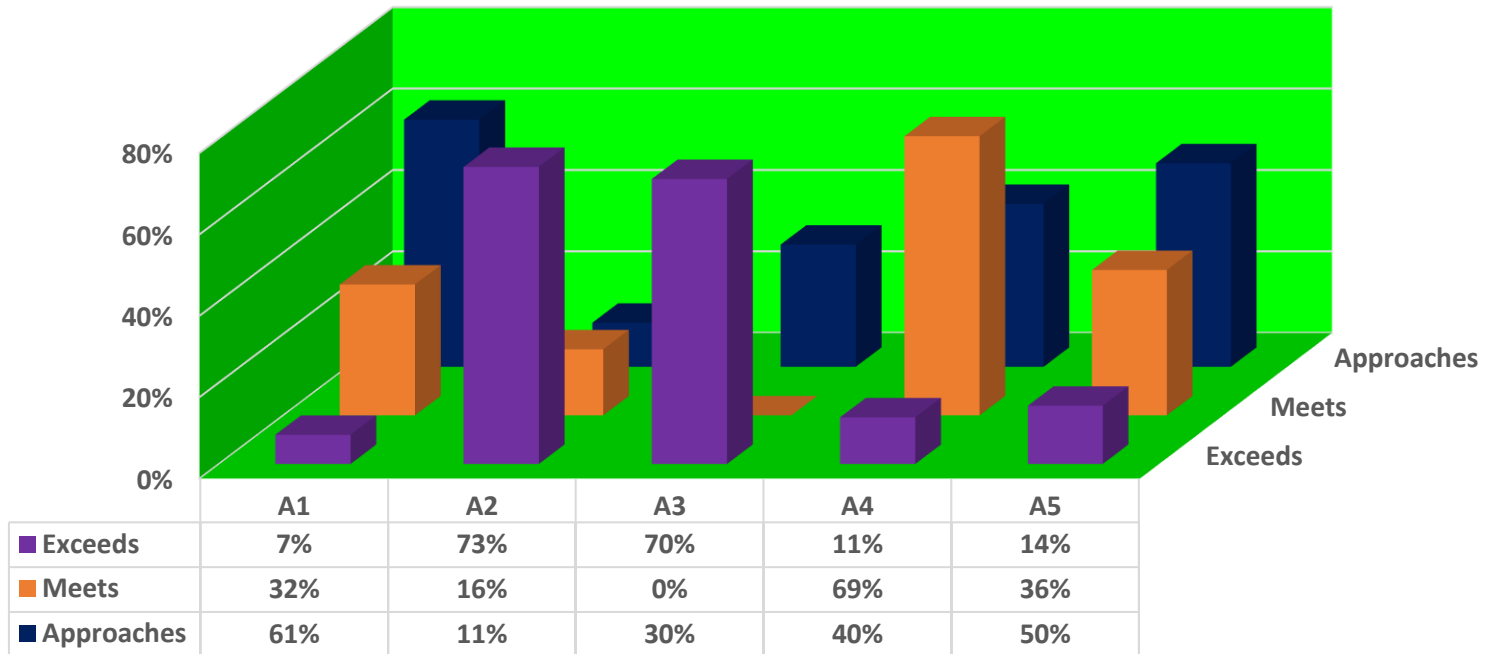
$$I = 100 \times \sum_{j=1}^L [(100 \times \sum_{i=1}^n \frac{PCI_i}{N}] / L \quad (3)$$

Table IV: Assessment of Program Learning Outcomes/Goals (PLOs/Goals)

Programs: Computer Science and Computer Information Systems

PLO/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 semester. F19 stands for fall 2019 and S20 is used for spring 2020 semester. Instructors assign program-based questions/projects to the student of five courses, CSIT224, CSIT231, CSIT241, CSI311 and CSIT341 during F19 and S20 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. The Instructors include specific exams questions in CSIT241, CSIT242 and CSIT341 as per the assessment plan.																																																						
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 CSIT224, CSIT241, CSIT242, CSIT311 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>A1. (DATA) Demonstrates an understanding of basic data structures and their representation A2. (OOP) Demonstrates an understanding of a high-level object-oriented programming language and software design A3. (DIGITAL) Demonstrates an understanding of number systems and digital logic A4. (ORGA) Demonstrates an understanding of computer organization and architecture 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>CSIT224 (F19)</td> <td>-</td> <td>16, 4, 3</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>CSIT224 (S20)</td> <td>-</td> <td>11, 2, 1</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>CSIT231 (F19)</td> <td>-</td> <td>-</td> <td>-</td> <td>2, 12, 7</td> <td>-</td> </tr> <tr> <td>CSIT241 (F19)</td> <td>-</td> <td>-</td> <td>16, 0, 9</td> <td>-</td> <td>-</td> </tr> <tr> <td>CSIT241, 242 (S20)</td> <td>-</td> <td>-</td> <td>12, 0, 3</td> <td>-</td> <td>-</td> </tr> <tr> <td>CSIT311 (F19)</td> <td>-</td> <td>-</td> <td>-</td> <td>2, 12, 4</td> <td>-</td> </tr> <tr> <td>CSIT341 (F19)</td> <td>1, 2, 7</td> <td>-</td> <td>-</td> <td>-</td> <td>2, 2, 5</td> </tr> <tr> <td>CSIT341 (S20)</td> <td>1, 7, 10</td> <td>-</td> <td>-</td> <td>-</td> <td>2, 8, 9</td> </tr> </tbody> </table>	Course Offered	A1 (DATA)	A2 (OBJECT)	A3 (DIGITAL)	A4 (ORGA)	A5 (ALGM)	CSIT224 (F19)	-	16, 4, 3	-	-	-	CSIT224 (S20)	-	11, 2, 1	-	-	-	CSIT231 (F19)	-	-	-	2, 12, 7	-	CSIT241 (F19)	-	-	16, 0, 9	-	-	CSIT241, 242 (S20)	-	-	12, 0, 3	-	-	CSIT311 (F19)	-	-	-	2, 12, 4	-	CSIT341 (F19)	1, 2, 7	-	-	-	2, 2, 5	CSIT341 (S20)	1, 7, 10	-	-	-	2, 8, 9
Course Offered	A1 (DATA)	A2 (OBJECT)	A3 (DIGITAL)	A4 (ORGA)	A5 (ALGM)																																																		
CSIT224 (F19)	-	16, 4, 3	-	-	-																																																		
CSIT224 (S20)	-	11, 2, 1	-	-	-																																																		
CSIT231 (F19)	-	-	-	2, 12, 7	-																																																		
CSIT241 (F19)	-	-	16, 0, 9	-	-																																																		
CSIT241, 242 (S20)	-	-	12, 0, 3	-	-																																																		
CSIT311 (F19)	-	-	-	2, 12, 4	-																																																		
CSIT341 (F19)	1, 2, 7	-	-	-	2, 2, 5																																																		
CSIT341 (S20)	1, 7, 10	-	-	-	2, 8, 9																																																		

PLO A: Percentile Performance of A1, A2, A3, A4 & A5

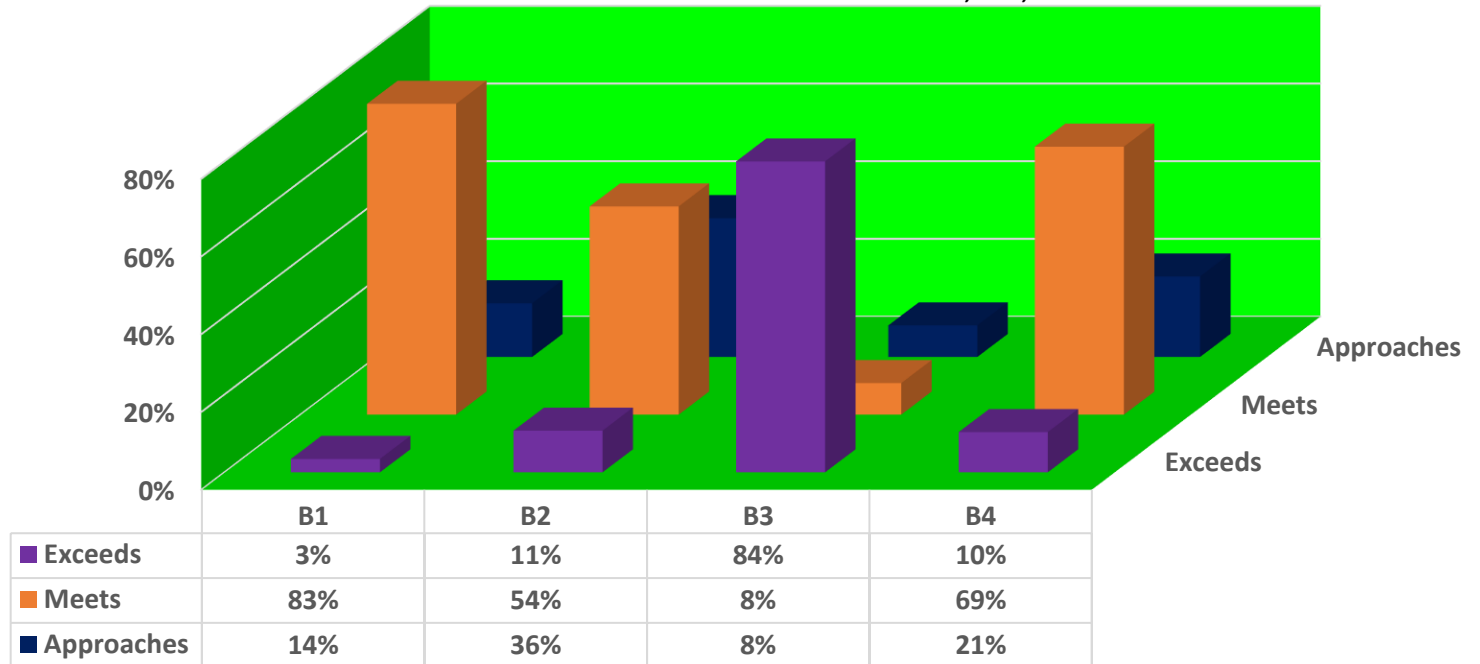


PLO/Goal B:	An ability to analyze a problem and identify and define the computing requirements appropriate to its solution.
Assessment Method(s)	Students are given programming assignments in which they analyze and solve a problem using appropriate paradigms and resources to arrive at its solution
Data Source	The data was collected by the Instructors of CSIT224, CSIT341 and CSIT425 in both fall 2019 and spring 2020 semesters. In CSIT425 course, data were collected by two 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 2019 and spring 2020 semesters. In CSIT224, data were collected using one midterm and one final online exam and two C# projects assigned to students.
Assessment Results	Following are the assessment results as per performance criteria B1, B2, B3 and B4. B1. (SPEC) Demonstrates abilities 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)
CSIT224 (F19)	-	-	19, 3, 1	-
CSIT224 (S20)	-	-	12, 0, 2	-
CSIT341 (F19)	-	2, 6, 1	-	-
CSIT341(S20)	-	1, 9, 9	-	-
CSIT425-01 (F19)	0, 16, 0	-	-	0, 16, 0
CSIT425-01 (S20)	0, 8, 4	-	-	0, , 8, 4
CSIT425-02 (S20)	2, 8, 0	-	-	6, 0, 8

PLO B: Percentile Performance of B1, B2, B3 & B4

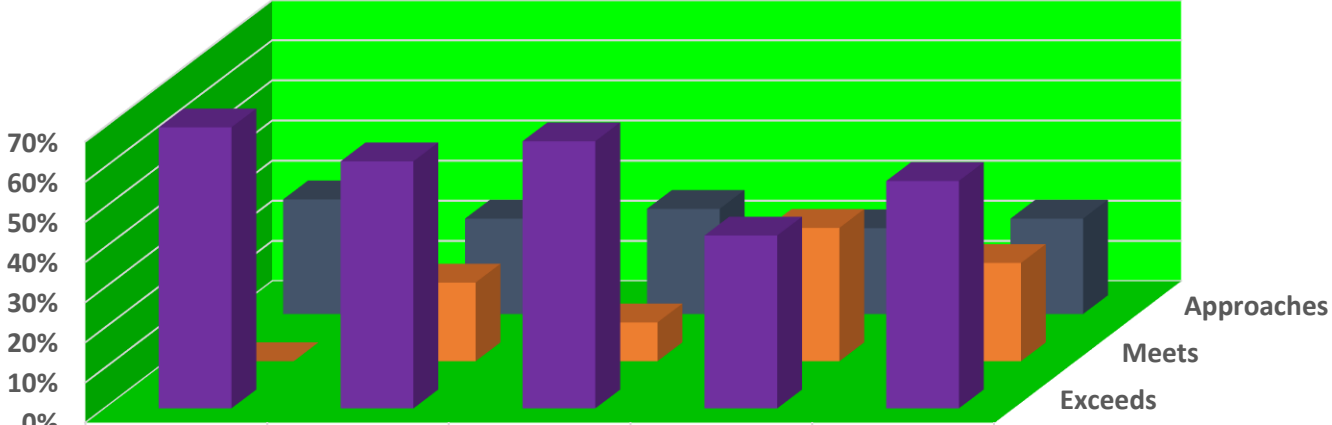


PLO/Goal C:

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.

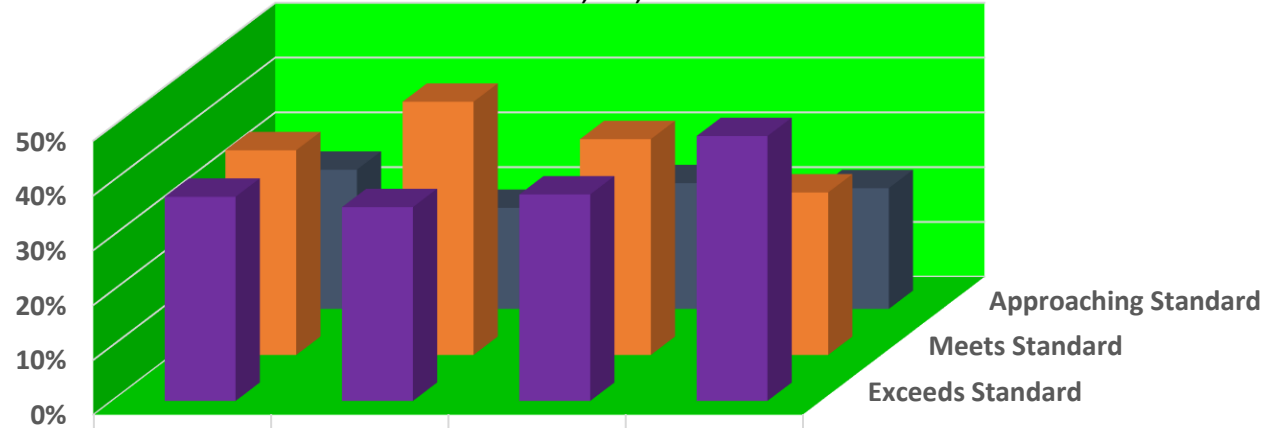
Data Source	The data for course CSIT425 was collected by three Instructors: one section of CSIT425 course offered in fall 2019 and for two sections of the same course during spring 2020. All three instructor’s data collection is based on Final Project assigned to a team of students. All three instructors also 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.																																																
Assessment Results	<p>Following are the assessment results as per performance criteria C1 through C5.</p> <p>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.</p> <p>Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching).</p> <table border="1"> <thead> <tr> <th>Course Offered</th> <th>C1 (DESIGN)</th> <th>C2 (REQ)</th> <th>C3 (METRIC)</th> <th>C4 (TEST)</th> <th>C5 (OPTIM)</th> </tr> </thead> <tbody> <tr> <td>CSIT425-01 (F19)</td> <td>12, 0, 4</td> <td>12, 0, 4</td> <td>12, 0, 4</td> <td>12, 0, 4</td> <td>12, 0, 4</td> </tr> <tr> <td>CSIT425-01 (S20)</td> <td>0, 4, 8</td> <td>0, 4, 8</td> <td>0, 4, 8</td> <td>0, 8, 4</td> <td>0, 4, 8</td> </tr> <tr> <td>CSIT425-02 (S20)</td> <td>6, 0, 8</td> <td>2, 8, 4</td> <td>4, 4, 6</td> <td>0, 6, 8</td> <td>0, 10, 4</td> </tr> </tbody> </table> <p style="text-align: center;">PLO C: Percentile Performance of C1, C2, C3, C4 and C5</p>  <table border="1"> <thead> <tr> <th></th> <th>C1</th> <th>C2</th> <th>C3</th> <th>C4</th> <th>C5</th> </tr> </thead> <tbody> <tr> <td>Exceeds</td> <td>71%</td> <td>62%</td> <td>67%</td> <td>43%</td> <td>57%</td> </tr> <tr> <td>Meets</td> <td>0%</td> <td>20%</td> <td>10%</td> <td>33%</td> <td>24%</td> </tr> <tr> <td>Approaches</td> <td>29%</td> <td>24%</td> <td>26%</td> <td>21%</td> <td>24%</td> </tr> </tbody> </table>	Course Offered	C1 (DESIGN)	C2 (REQ)	C3 (METRIC)	C4 (TEST)	C5 (OPTIM)	CSIT425-01 (F19)	12, 0, 4	12, 0, 4	12, 0, 4	12, 0, 4	12, 0, 4	CSIT425-01 (S20)	0, 4, 8	0, 4, 8	0, 4, 8	0, 8, 4	0, 4, 8	CSIT425-02 (S20)	6, 0, 8	2, 8, 4	4, 4, 6	0, 6, 8	0, 10, 4		C1	C2	C3	C4	C5	Exceeds	71%	62%	67%	43%	57%	Meets	0%	20%	10%	33%	24%	Approaches	29%	24%	26%	21%	24%
Course Offered	C1 (DESIGN)	C2 (REQ)	C3 (METRIC)	C4 (TEST)	C5 (OPTIM)																																												
CSIT425-01 (F19)	12, 0, 4	12, 0, 4	12, 0, 4	12, 0, 4	12, 0, 4																																												
CSIT425-01 (S20)	0, 4, 8	0, 4, 8	0, 4, 8	0, 8, 4	0, 4, 8																																												
CSIT425-02 (S20)	6, 0, 8	2, 8, 4	4, 4, 6	0, 6, 8	0, 10, 4																																												
	C1	C2	C3	C4	C5																																												
Exceeds	71%	62%	67%	43%	57%																																												
Meets	0%	20%	10%	33%	24%																																												
Approaches	29%	24%	26%	21%	24%																																												
PLO/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 was collected by the two Instructors teaching three sections of CSIT425 course: one section in fall 2019 and two section during spring 2020. Both instructor’s data collection is based on Final Project assigned to a team of students. Both instructors also 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.																																												
Assessment Results	<p>Following are the assessment results as per performance criteria D1 through D4.</p> <p>D1. (DOCU) Demonstrates ability to document well the work.</p> <p>D2. (INTER) Demonstrates ability to communicate with team members, listen actively, provide feedback and share information.</p> <p>D3. (VALID) Demonstrates the ability to validate research on an assigned relational database systems topic using empirical evidence to support claims.</p> <p>D4. (DEAD) Demonstrates ability to meet deadlines.</p> <p>Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching).</p> <table border="1"> <thead> <tr> <th>Course Offered</th> <th>C1 (DESIGN)</th> <th>C2 (REQ)</th> <th>C3 (METRIC)</th> <th>C4 (TEST)</th> <th>C5 (OPTIM)</th> </tr> </thead> <tbody> <tr> <td>CSIT425-01 (F19)</td> <td>4, 12, 0</td> <td>4, 12, 0</td> <td>4, 12, 0</td> <td>4, 12, 0</td> <td>4, 12, 0</td> </tr> <tr> <td>CSIT425-01 (S20)</td> <td>0, 8, 4</td> <td>0, 8, 4</td> <td>0, 8, 4</td> <td>0, 8, 4</td> <td>0, 8, 4</td> </tr> <tr> <td>CSIT425-02 (S20)</td> <td>3, 6, 4</td> <td>3, 4, 6</td> <td>1, 6, 6</td> <td>0, 6, 8</td> <td>1, 10, 2</td> </tr> </tbody> </table> <p style="text-align: center;">PLO D: Percentile Performance of D1, D2, D3 and D4</p> <table border="1"> <thead> <tr> <th></th> <th>D1</th> <th>D2</th> <th>D3</th> <th>D4</th> </tr> </thead> <tbody> <tr> <td>Exceeds</td> <td>24%</td> <td>24%</td> <td>17%</td> <td>17%</td> </tr> <tr> <td>Meets</td> <td>62%</td> <td>55%</td> <td>62%</td> <td>76%</td> </tr> <tr> <td>Approaches</td> <td>14%</td> <td>21%</td> <td>21%</td> <td>7%</td> </tr> </tbody> </table>	Course Offered	C1 (DESIGN)	C2 (REQ)	C3 (METRIC)	C4 (TEST)	C5 (OPTIM)	CSIT425-01 (F19)	4, 12, 0	4, 12, 0	4, 12, 0	4, 12, 0	4, 12, 0	CSIT425-01 (S20)	0, 8, 4	0, 8, 4	0, 8, 4	0, 8, 4	0, 8, 4	CSIT425-02 (S20)	3, 6, 4	3, 4, 6	1, 6, 6	0, 6, 8	1, 10, 2		D1	D2	D3	D4	Exceeds	24%	24%	17%	17%	Meets	62%	55%	62%	76%	Approaches	14%	21%	21%	7%
Course Offered	C1 (DESIGN)	C2 (REQ)	C3 (METRIC)	C4 (TEST)	C5 (OPTIM)																																								
CSIT425-01 (F19)	4, 12, 0	4, 12, 0	4, 12, 0	4, 12, 0	4, 12, 0																																								
CSIT425-01 (S20)	0, 8, 4	0, 8, 4	0, 8, 4	0, 8, 4	0, 8, 4																																								
CSIT425-02 (S20)	3, 6, 4	3, 4, 6	1, 6, 6	0, 6, 8	1, 10, 2																																								
	D1	D2	D3	D4																																									
Exceeds	24%	24%	17%	17%																																									
Meets	62%	55%	62%	76%																																									
Approaches	14%	21%	21%	7%																																									
PLO/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 only for CSIT201 course taught in both fall 2019 and spring 2020 by two different instructors. Both instructors picked relevant questions from two exams. Consequently, both instructors picked five questions for E1, two questions for E2 and four questions for E3.																												
Assessment Results	<p>Following are the assessment results as per performance criteria E1 through E3.</p> <p>E1. (ETHIC) Understands the ethical issues related to technology.</p> <p>E2. (SECUR) Understands the security issues and problems of identity theft.</p> <p>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 (F19)</td> <td>23, 2, 0</td> <td>24, 1, 0</td> <td>22, 2, 1</td> </tr> <tr> <td>CSIT201 (S20)</td> <td>17, 0, 1</td> <td>5, 9, 4</td> <td>1, 13, 4</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th></th> <th>E1</th> <th>E2</th> <th>E3</th> </tr> </thead> <tbody> <tr> <td>Exceeds</td> <td>94%</td> <td>28%</td> <td>6%</td> </tr> <tr> <td>Meets</td> <td>0%</td> <td>50%</td> <td>72%</td> </tr> <tr> <td>Approaching</td> <td>6%</td> <td>22%</td> <td>22%</td> </tr> </tbody> </table>	Course Offered	E1 (ETHIC)	E2 (SECUR)	E3 (MAL)	CSIT201 (F19)	23, 2, 0	24, 1, 0	22, 2, 1	CSIT201 (S20)	17, 0, 1	5, 9, 4	1, 13, 4		E1	E2	E3	Exceeds	94%	28%	6%	Meets	0%	50%	72%	Approaching	6%	22%	22%
Course Offered	E1 (ETHIC)	E2 (SECUR)	E3 (MAL)																										
CSIT201 (F19)	23, 2, 0	24, 1, 0	22, 2, 1																										
CSIT201 (S20)	17, 0, 1	5, 9, 4	1, 13, 4																										
	E1	E2	E3																										
Exceeds	94%	28%	6%																										
Meets	0%	50%	72%																										
Approaching	6%	22%	22%																										
PLO/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 last four/five weeks of the course work. Each group presentation is evaluated by their peers as well by the instructor. Instructor collects assessment data and forwards it to the assessment Committee Chair.																																																												
Data Source	<p>The data collection was done by four instructors offering CSIT425, CSIT43, CSIT455 and CSIT462 in fall 2019 semester, whereas five Instructors offering CSIT425-01, CSIT425-02, CSIT431, CSIT441 and CSIT455 courses in spring 2020. 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 ppt. 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 nine instructors are involved in teaching these nine courses: four courses in fall 2019 and five courses in spring 2020 semester. It is worthwhile to mention that we did not offer CSIT441 in fall 2019. Similarly, CSIT462 was not offered in spring 2020. There is another issue involving an instructor teaching CSIT455 in spring 2020 that he did not send the assessment data to the Assessment Coordinator even with several repeated email requests. Consequently, we were unable to perform the analysis of three courses CSIT441 (F19), CSIT455 (S20) and CSIT462 (S20) and include the results of these three courses in the current report.</p>																																																												
Assessment Results	<p>Following are the assessment results as per performance criteria (PC) F1 through F4.</p> <p>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>CSIT425-01 (F19)</td> <td>11, 11, 10</td> <td>11, 11, 10</td> <td>11, 11, 10</td> <td>11, 11, 10</td> </tr> <tr> <td>CSIT425-01 (S20)</td> <td>3, 3, 6</td> <td>3, 3, 6</td> <td>3, 3, 6</td> <td>3, 3, 6</td> </tr> <tr> <td>CSIT425-02 (S20)</td> <td>6, 3, 5</td> <td>6, 6, 2</td> <td>6, 6, 2</td> <td>6, 5, 3</td> </tr> <tr> <td>CSIT431 (F19)</td> <td>5, 6, 9</td> <td>0, 20, 0</td> <td>5, 6, 9</td> <td>10, 3, 5</td> </tr> <tr> <td>CSIT431 (S20)</td> <td>8, 8, 1</td> <td>0, 16, 1</td> <td>8, 8, 1</td> <td>0, 8, 9</td> </tr> <tr> <td>CSIT441 (F19)</td> <td colspan="4">Not offered this spring</td> </tr> <tr> <td>CSIT441 (S20)</td> <td>2, 8, 4</td> <td>2, 6, 6</td> <td>2, 6, 6</td> <td>4, 6, 4</td> </tr> <tr> <td>CSIT455 (F19)</td> <td>14, 4, 1</td> <td>15, 3, 1</td> <td>14, 4, 1</td> <td>15, 3, 1</td> </tr> <tr> <td>CSIT455 (S20)</td> <td colspan="4">This instructor did not send assessment data</td> </tr> <tr> <td>CSIT462 (F19)</td> <td>4, 10, 0</td> <td>3, 11, 0</td> <td>3, 11, 0</td> <td>12, 0, 2</td> </tr> <tr> <td>CSIT462 (S20)</td> <td colspan="4">Not offered this spring</td> </tr> </tbody> </table>	Course Offered	F1 (VERBAL)	F2 (PRESENT)	F3 (ORGN)	F4 (KNOW)	CSIT425-01 (F19)	11, 11, 10	11, 11, 10	11, 11, 10	11, 11, 10	CSIT425-01 (S20)	3, 3, 6	3, 3, 6	3, 3, 6	3, 3, 6	CSIT425-02 (S20)	6, 3, 5	6, 6, 2	6, 6, 2	6, 5, 3	CSIT431 (F19)	5, 6, 9	0, 20, 0	5, 6, 9	10, 3, 5	CSIT431 (S20)	8, 8, 1	0, 16, 1	8, 8, 1	0, 8, 9	CSIT441 (F19)	Not offered this spring				CSIT441 (S20)	2, 8, 4	2, 6, 6	2, 6, 6	4, 6, 4	CSIT455 (F19)	14, 4, 1	15, 3, 1	14, 4, 1	15, 3, 1	CSIT455 (S20)	This instructor did not send assessment data				CSIT462 (F19)	4, 10, 0	3, 11, 0	3, 11, 0	12, 0, 2	CSIT462 (S20)	Not offered this spring			
Course Offered	F1 (VERBAL)	F2 (PRESENT)	F3 (ORGN)	F4 (KNOW)																																																									
CSIT425-01 (F19)	11, 11, 10	11, 11, 10	11, 11, 10	11, 11, 10																																																									
CSIT425-01 (S20)	3, 3, 6	3, 3, 6	3, 3, 6	3, 3, 6																																																									
CSIT425-02 (S20)	6, 3, 5	6, 6, 2	6, 6, 2	6, 5, 3																																																									
CSIT431 (F19)	5, 6, 9	0, 20, 0	5, 6, 9	10, 3, 5																																																									
CSIT431 (S20)	8, 8, 1	0, 16, 1	8, 8, 1	0, 8, 9																																																									
CSIT441 (F19)	Not offered this spring																																																												
CSIT441 (S20)	2, 8, 4	2, 6, 6	2, 6, 6	4, 6, 4																																																									
CSIT455 (F19)	14, 4, 1	15, 3, 1	14, 4, 1	15, 3, 1																																																									
CSIT455 (S20)	This instructor did not send assessment data																																																												
CSIT462 (F19)	4, 10, 0	3, 11, 0	3, 11, 0	12, 0, 2																																																									
CSIT462 (S20)	Not offered this spring																																																												

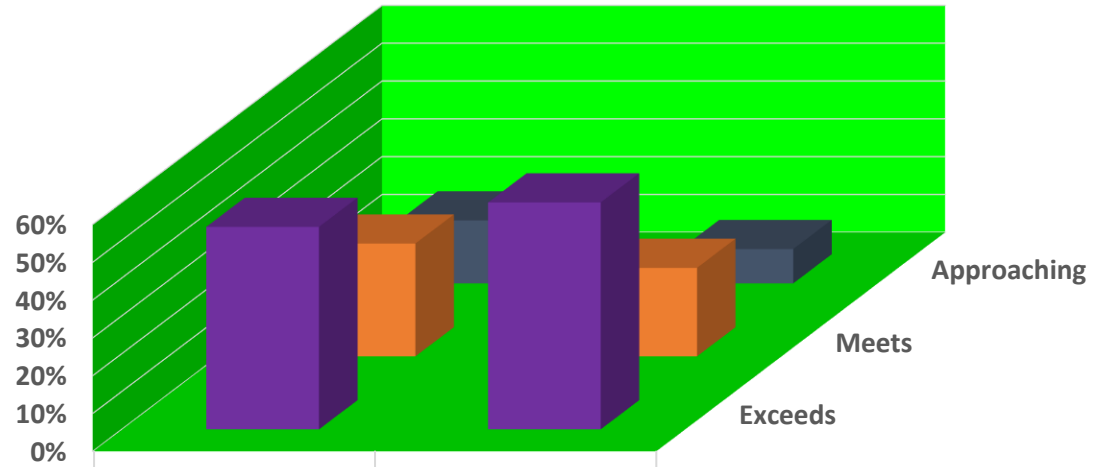
PLO F: Percentile Performance of F1, F2, F3 and F4



	F1	F2	F3	F4
Exceeds Standard	37%	35%	38%	48%
Meets Standard	37%	46%	39%	30%
Approaching Standard	25%	18%	23%	22%

PLO/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 2020 and another in spring 2020, so that data analysis on goal G could be performed and reported in current assessment report. The instructor of fall 2019 picked three questions from exams for G1 and for G2 one question was specially designed to collect the data on this goal. Instructor teaching this course in spring 2020 picked question 3 from homework 4 for G1 and question 1 from worksheet 4 for G2.									
Assessment Results	<p>Following are the assessment results as per performance criteria G1 through 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 PLO.</p> <table border="1"> <thead> <tr> <th>Course Offered</th> <th>G1 (IMPACT)</th> <th>G2 (SOCIETY)</th> </tr> </thead> <tbody> <tr> <td>CSIT201 (F19)</td> <td>16, 7, 2</td> <td>17, 6, 2</td> </tr> <tr> <td>CSIT201 (S20)</td> <td>6, 6, 6</td> <td>12, 4, 2</td> </tr> </tbody> </table>	Course Offered	G1 (IMPACT)	G2 (SOCIETY)	CSIT201 (F19)	16, 7, 2	17, 6, 2	CSIT201 (S20)	6, 6, 6	12, 4, 2
Course Offered	G1 (IMPACT)	G2 (SOCIETY)								
CSIT201 (F19)	16, 7, 2	17, 6, 2								
CSIT201 (S20)	6, 6, 6	12, 4, 2								

PLO G: Percentile Performance of G1 and G2



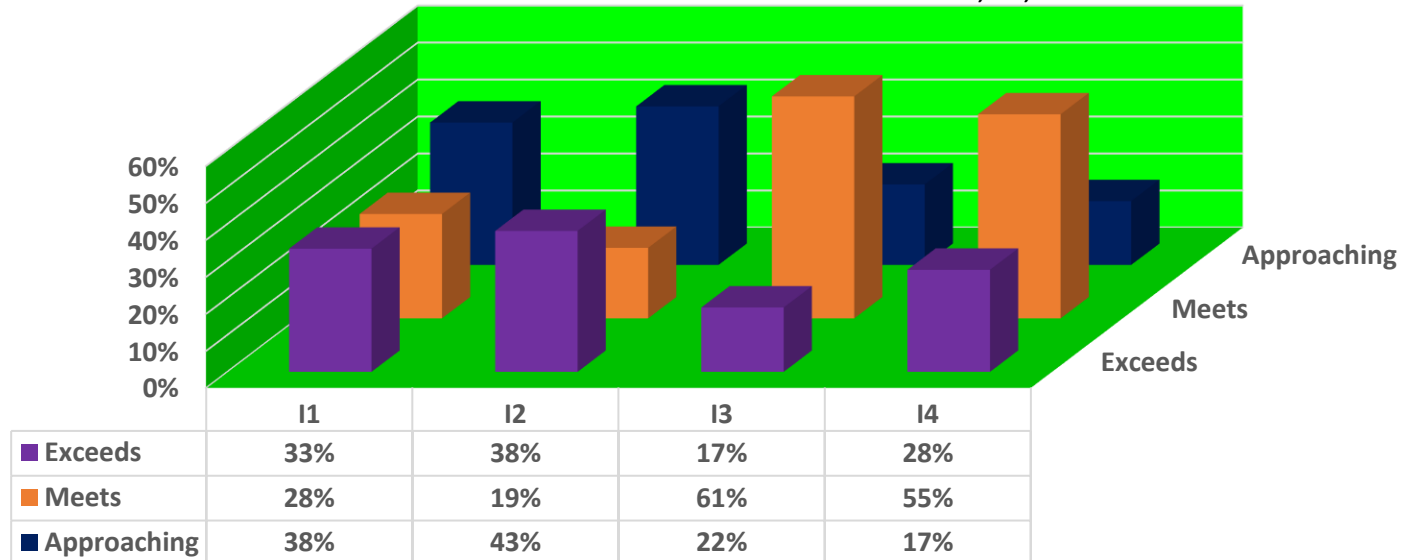
	G1	G2
Exceeds	54%	68%
Meets	30%	23%
Approaching	17%	9%

PLO/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	Seven courses were picked for the data collection in fall2019 and spring 2020. The data was collected by the three Instructors offering CSIT221 course: one section in fall2019 and two sections in spring 2020 for PLO I1. Two sections of CSIT231 course were used to collect data for I2: one section in fall 2019 and another section in spring 2020. One section of CSIT311 course offered in fall 2019 and another section of CSIT321 course were used to collect data for I2 and I3, respectively. The data collection is done C++ using MS VB.NET, Bash/C on Linux server and one other computing language for the three respective courses. One section of CSIT311 course was offered during fall 2019, and therefore, data was collected on Assembly Language for Goal/PLO, I2. One section of CSIT321 offered in spring 2020 was used for data collection of Goal I3.
Assessment Results	<p>Following are the assessment results as per performance criteria I1 through I4.</p> <p>Performance Criteria</p> <p>I1. (C++) Demonstrates competency in C++ programming.</p> <p>I2. (ASSEMB) Demonstrates competency in assembly language programming</p> <p>I3. (OTHER) Demonstrates competency in programming in other languages</p> <p>I4. (UNIX) Demonstrates competency in the use of the UNIX operating system</p>

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

Course Offered	I1 (C++)	I2 (ASSEMB)	I3 (OTH)	I4 (LINUX)
CSIT221-01 (F19)	7, 7, 7	-	-	-
CSIT221-01 (S20)	5, 5, 2	-	-	-
CSIT221-02 (S20)	6, 3, 10	-	-	-
CSIT231 (F19)	-	-	-	5, 5, 2
CSIT231 (S20)	-	-	-	1, 11, 5
CSIT311 (F19)	-	8, 4, 9	-	-
CSIT321 (S20)	-	--	5, 5, 2	-

PLO E: Percentile Performance of I1, I2, I3 & I4



PLO/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 2019 and spring 2020. The instructor picked the data from assigned homework and programming problems as well as from some exam questions.

Assessment Results

Following are the assessment results as per performance criteria J1 through J4.

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

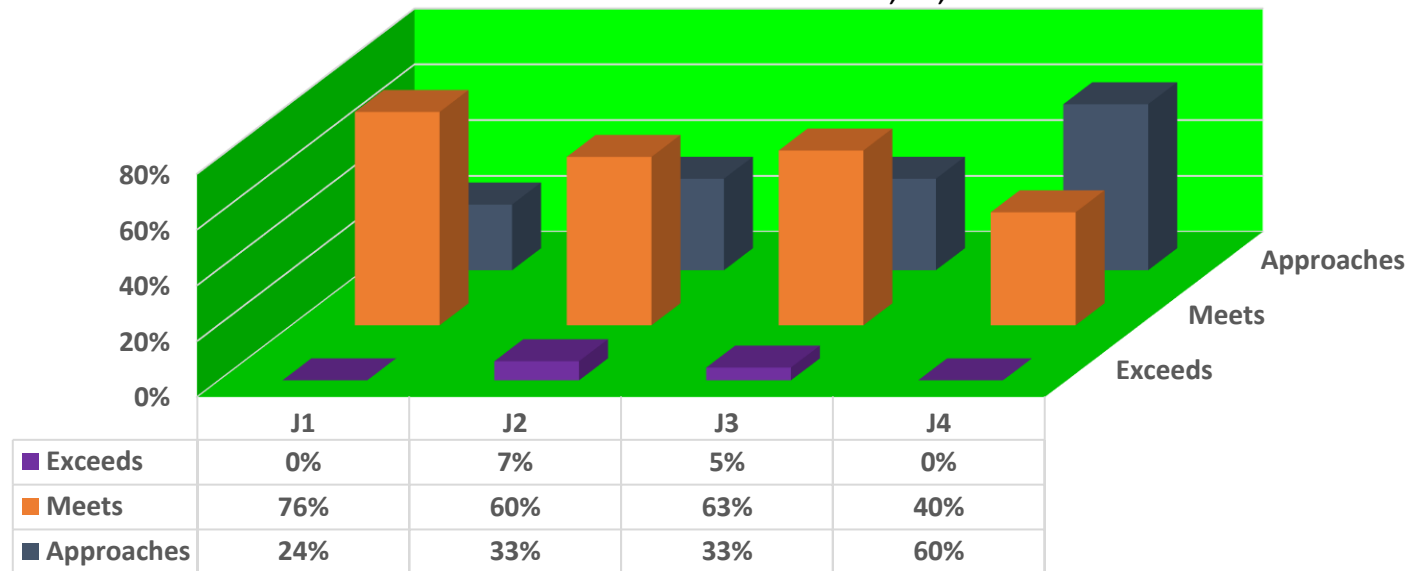
J3. (EFFIC) Demonstrates an ability to evaluate algorithm efficiency

J4. (MEMORY) Understands the tradeoff between memory and running time

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

Course Offered	J1 (MODEL)	J2 (ALGM)	J3 (EFFIC)	J4 (MEMORY)
CSIT341 (F19)	0, 8, 1	3, 4, 4	2, 5, 4	0, 3, 6
CSIT341 (S20)	0, 14, 5	0, 13, 6	0, 13, 6	0, 8, 11

PLO J: Percentile Performance of J1, J2, J3 and J4



PLO/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 three Instructors offering one section of CSIT425 course in fall 2019, and two sections of the same course in spring 2020. One instructor picked the measures to achieve this goal K from Group Project’s functional and non-functional requirements, deliverables and milestones, project plan, and group project total points awarded. Oher instructor used the following parameters in his data collection: formal

project description such as requirements, design specifications and UML, time estimation to complete project, project planning, project documentation and user's guide.

Assessment Results

Following are the assessment results as per performance criteria K1 through K4.

Performance Criteria

K1. (FORMAL) Demonstrates an ability of formally describing a software system

K2. (ESTIM) Ability to establish estimates

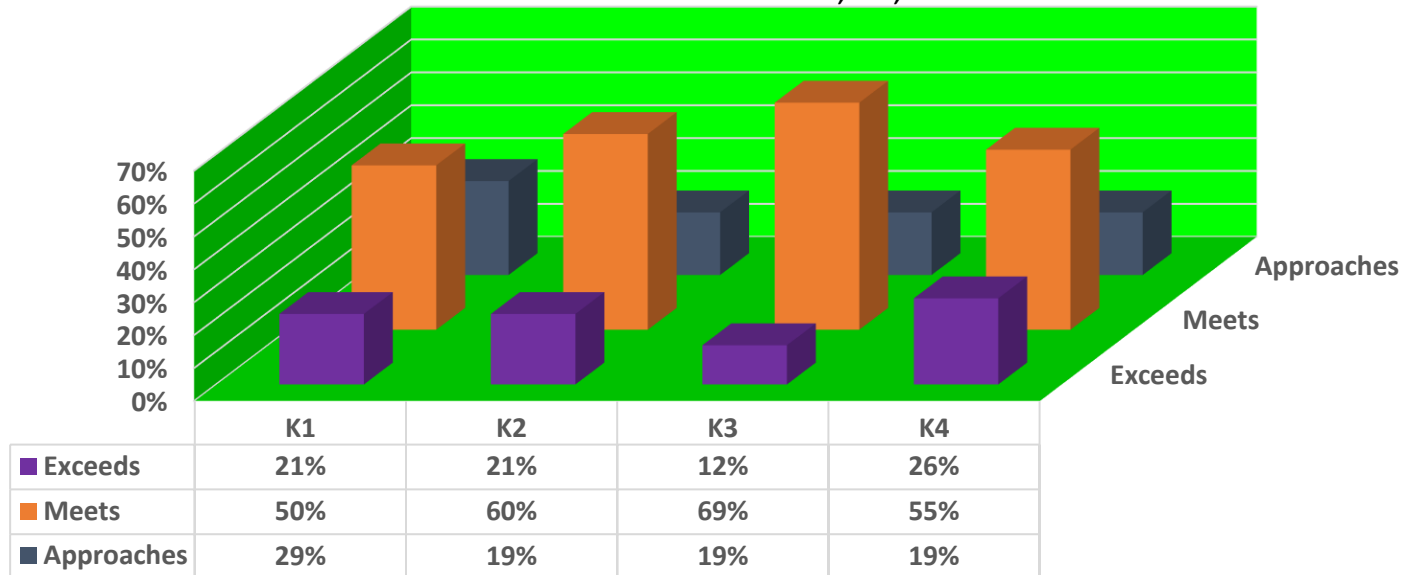
K3. (PLAN) Able to develop a project plan

K4. (DOCU) Able to provide adequate internal and external documentation

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

Course Offered	K1 (FORMAL)	K2 (ESTIM)	(K3 PLAN)	K4 (DOCU)
CSIT425-01 (F19)	5, 11, 0	5, 11, 0	5, 11, 0	5, 11, 0
CSIT425-01 (S20)	0, 8, 4	0, 8, 4	0, 8, 4	0, 8, 4
CSIT425-02 (S20)	4, 2, 8	4, 6, 4	0, 10, 14	6, 4, 4

PLO K: Percentile Performance of K1, K2, K3 and K4



PLO/Goal H:

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

Assessment Method(s) In spring 2019, Graduating Senior Exit Survey has been redesigned using Google Form on University Google Drive storage space so that students could fill it out online anonymously. Senior students graduating in fall 2019 and spring 2020 were requested to fill out senior exit survey before/on a deadline date set by the department. This anonymous senior exit survey would help us to refine the CIS curriculum, and consequently, 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 both fall 2019 and spring 2020 semesters, the department secretary invited the graduating senior students to fill out an online senior exit survey.

Assessment Results The data is collected by the department secretary is forwarded to the Department Chair and Assessment Coordinator. 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 2019 and spring 2020 semesters. Total number of students graduated in fall 2019 and spring 2020 semesters is 36, (which excludes the number of 9 seniors who were graduated in CIS minor in spring 2020). Among 36 graduating senior students, 25 students graduated in Computer Science (CS) and remaining 11 senior students graduated in Information Systems (IS). I am to state that only four CIS senior graduating students participated in senior exit survey in fall 2019 and whereas only 5 senior graduating students participated in spring of 2020 although the number of students graduating in fall 2019 semester was 11 and this number is 25 for spring 2020 semester. Student participation in senior graduating exit survey in fall 2019 is 36%. However, in spring 2020 semester, the senior student participation is low -only 20%, which is 1.8 times less in comparison to its counter-part in fall 2019 semester. The overall combined senior student participation in both fall 2019 and spring 2020 semesters is 25%. Senior students graduating in fall 2019 spent between 3 – 14 semesters to graduate from the Fredonia University. However, Senior students graduating in spring 2020 could major between 8 – 12 semesters at Fredonia University. Among eleven senior graduating students in fall 2019, three senior students were transfer students in our data sample. Similarly, this number of transfer senior students in spring 2020 is 2. The students transferring to Fredonia from another school or transferring from another major have already earned 30-75 credits in fall 2019 and its counterpart for spring 2020 semester is 60 -75 credits. Consequently, this category of students spent on the average one/three years for graduating from the Fredonia University. One senior student changed his major from Computer Science to Information Systems, whereas another student changed his major from Music to Computer Science. Positive and negative feedback from senior students who participated in fall 2019 and spring 2020 senior graduating exit survey will be discussed below in conclusions section of this assessment report.

Table V: A list of Senior Graduating Students in fall 2019 and spring 2020 semesters

	Total # of Majors	CS Majors	IS Majors	Senior Survey Participation	Percentile of Senior Survey Participation	Number of Transfer	Number of Semesters	Number of Credits Earned
Fall 2019	11	6	5	4	36 %	3	3 -14	30 - 75
Spring 2020	25	20	5	5	20 %	2	8 - 12	60 - 75
Grand Total	36	26	10	9	25 %	5	-	-

Conclusions

Have you had an opportunity to discuss these results within your department? If so, what form did this take?

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 2019 and spring 2020 semesters and providing them with a tailor-made rubric for recording the assessment data correctly. However, One instructor teaching CSIT455 in spring 2020 did not send his assessment data even with several repeated emails. As done before in the annual Assessment Report AY 2018-2019, I have set a lower limit on to the percentile performance of a given PLO/Goal to 70%. If any course offered in fall 2019 and spring 2020 semesters has percentile performance less than 70%, then for that course PLO/Goal is to be reexamined in future assessment analysis to close the loop. If we implement this performance criteria to all the courses offered in fall 2019 and spring 2020 semesters, we find that only three courses, CSIT221, CSIT311 and CSIT341 need special attention. Therefore, we list these three courses along with their PLO/Goals to be re-examined in the future data collection and analysis work: CSIT221 (I1), CSIT311 (I2), and CSIT341 (A1, A5, B2, J2, J3, J4). I would request the Department Chair to include an agenda item in the first faculty meeting to be held during beginning of Fall 2020 semester so-as-to take proper steps to enhance the quality of collected data especially in three CSIT221, CSIT311 and CSIT341 courses to be taught by the respective instructors in the coming fall 2020 and spring 2021 semesters. Special emphasis is to be given to PLOs/Goals as listed in parentheses of these three courses.

What conclusions were drawn about student learning as a result of their assessment efforts?

This assessment report represents a systematic study of compiled results of assessment data collected for eleven Goals or PLOs: A, B, C, D, E, F, G, H, I, J and K during fall 2019 and spring 2020 semesters. As told by Dr. Zubairi that he was instrumental in developing the relevant equations to aggregate the assessment data in the past data analysis from six/seven years. I am to state that these three equations have been rewritten elegantly in mathematical form by Dr. Singh. Additionally, Dr. Singh collected the assessment raw data from several Instructors teaching relevant courses in fall 2019 and spring 2020 semesters. The raw data processing and analysis work are done using MS Excel 2016 software and the final conclusions are presented in this assessment report. All Instructors have cooperated and provided assessment data in a timely manner except one instructor teaching CSIT455 course in spring 2020. We believe that the assessment of eleven Goals or PLOs just in two semesters is itself is a great achievement. Additionally, Dr. Singh being full-time continent faculty in the CIS department has exceptionally tremendous teaching/service load.

The results of assessment data analysis are presented in tabular as well as in graphical form in this report at appropriate places. If we combine the percentile performance of two categories: Meets and Exceeds Standard, then the results are satisfactory for almost all the eleven Goals/PLOs investigated in the current study except for the three courses CSIT221 (I1), CSIT311 (I2), CSIT341 (A1, A5, B2, J2, J3, J4), where all PLOs/Goals A1, A5, B2, I1, I2, J2, J3 and J4 fall below 70%, but particularly for Goal I2 of CSIT311 and Goal J4 of CSIT341 courses, percentile performance equals 57% and 40%, respectively. For most of PLOs, we obtain percentile performance that lies in the range of 70-100%. However, I2 for CSIT311 course and Goal J4 for CSIT341 course need a considerable improvement in the future data collection of course offerings in fall 2020 and maybe in spring 2021 semester if similar results are obtained in fall 2020 semester. Therefore, we conclude that more data collection is surely required to improve upon the percentile performance of several PLOs as listed above to close the loop. This important issue could be included and discussed in the first faculty meeting to be held in the coming August/September 2020.

At the end of this assessment report, the results of senior exit survey are presented. When asked to rate their level of satisfaction with the CIS Department on a scale of 0 to 5, three senior students who responded to Senior Exit Survey gave a score of 4/5. Two students rated it 3/5 points and remaining four students rated the department in a scale of 1 - 2. The overall average of the department rating is almost 3.0/5.0, which is not so bad considering the current situation that majority the CIS faculty is contingent. Therefore, to enhance department rating, Fredonia University must allocate more resources to the CIS department. Unfortunately, the seniors who participated in this exit survey only one student

took independent study/senior project course. Senior students who participated in the senior exit survey listed around 30 very useful courses being currently offered in the CIS department. Among these 30 listed courses, the following courses were listed to be very useful: CSIT107, CSIT207, CSIT221, CSIT224, CSIT241, CSIT242, CSIT231, CSIT232, CSIT311, CSIT321, CSIT333, CSIT335, CSIT341, CSIT425, CSIT431, CSIT435, CSIT441, CSIT455, CSIT461, CSIT462, CSIT463, CSIT471 and CSIT496.

When we talk about the accessibility of faculty offices and classrooms in the CIS department, the average rating in fall 2019 and spring 2020 semesters is very near to 4/5, which seems to be good. But when asked about the access to workspace and equipment for their coursework in the CIS department, graduating seniors gave the average rating in both fall 2019 and spring 2020 semesters as 3.13/5, which is once again above the average. 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: software engineering (CSIT425), Intro to operating systems (CSIT431), and computer science II (CSIT221). When asked to list the technology-related skills, if any, seniors have learned outside classes at Fredonia, answer is: Java, sound recording, web programming, Python, C#, .NET, Azure, DevOps, cloud computing etc.

Here are some plus points, cited only by three senior students in a sample of eleven students who participated in exit survey, about the department and its faculty:

1. Instructor 1 is the best lecturer and professor in the department, very challenging but fair
2. Instructor 2 was the only professor to make a true effort towards developing a relationship with students
3. Instructor 1 and Instructor 3 are very good at teaching certain things they know well and as a result those classes are very enjoyable. Instructor 1 and Instructor 3 have always given me the time of day to answer my questions the best they can.
4. I appreciate most of the professors try to make themselves available for the students that need help
5. Instructor 4 was very helpful
6. Instructor 5 was very fair and helpful

Unfortunately, Instructors 4 and 5 have resigned from the department last year and got similar or better teaching jobs somewhere else.

Here are some adverse remarks made by six senior students, which includes one student who made positive remarks too as listed above:

1. I suggest they get Computer Science teachers who actually know what they are teaching. I'm not being short - it's a fact.
2. The CS department's infighting has a very negative impact on students getting their coursework done. Lab computer access is too restrictive to get any work done i.e. we can't run any assembly programs associated with the Irvine32 libraries which, since it is being taught this way, is completely unacceptable. Professors who are forced to teach classes they have little to knowledge about helps no one. Teaching outdated technology helps no one. Not having enough competent professors helps no one. Prerequisite classes not offered frequently enough. I barely got my required classes done in time because of this. I have noticed most students do not grasp enough from their basic level courses to be efficient in the field, some I have encountered cannot even recall how to write a function prototype. Teaching Python to entry-level programmers is a disservice to the study of Computer Science.
3. The following comments are by a single senior student: "I can't understand instructor 1. Instructor 2 interrupts students in class constantly, also doesn't adequately respond to emails (leaves questions unanswered), hard to interpret test and homework questions.

Instructor 3 has changed the assignments or tests in systems programming in god knows how long, 80% of the class cheats their entire way through the course. Instructor 4 can be a rather unhelpful grader, test and homework questions often were hard to interpret. Instructor 5 paid little attention to the needs of his students and often ignored questions by students who were obviously confused by the curriculum, and also did not accept criticism well. Instructor 6 often would teach by saving the important information as the “A-HA” moment after starting lectures with drawn out scenarios which kept me disengaged majority of the time. Instructor 7 had given effort to developing relationships with students, but I was too frustrated by large parts of the curriculum that were clearly irrelevant to the goals of the class and how lectures and discussion would often turn into rambblings containing a small amount of relevant information that consumed the class.”

4. I feel like the computer science department has done its students a disservice. The professors are very smart but none of them know what it's like to work in these modern jobs. We are now competing with people who go to a 6-9 week coding boot camps and learn modern frameworks and we don't know any of that. These top companies no longer have a requirement for a bachelors and we are getting looked over for people who don't even really know anything about computer science. It feels like going to this college for my major was a waste of time. After this I'm going to pay more money to go to a coding boot camp so I can compete. The problem is we learn all this theory (which is good) but it seems like this curriculum need to be seriously updated. I don't have a problem with the language that we learned (C++) but I do have a problem with you teaching us theory and not making us apply it. There also should have been a class for seniors and juniors to learn about coding interviews the problems give and how to solve them. Especially since design and analysis of algorithms isn't a mandatory class. I'm so disappointed in the education I received at this institution, but I am not going to let it hinder me and my endeavors and I have to continue on educating myself by finding other resources.
5. Need more upper level electives, more electives in the computer science field, more professors, better professors,
6. Need more classes actually teaching programming languages, mostly just learned C++ in CS 1 and 2 and that's it for the most part nothing else is sufficiently taught
7. These comments are by a single senior student: “Algorithms should be in the CS Core. Algorithms is what makes Computer Science, Computer Science. The Professors need to learn how to teach beginners; because they are deep in their subject matter, it becomes hard for them to explain concepts in easy to understand ways for people just learning. You MUST work on this if you don't want people to drop out and transfer. Systems Programming and Systems Administrators are a dead and dying field, being replaced by DevOps people. Either scrap the course or replace it with modern DevOps with Docker, Jenkins, Kubernetes, and Continuous Integration principles. Problem Solving with Objects is a huge waste of a class in its current form. All we did was do outdated Windows App Forms in C#. It's terrible. Get rid of that class, and simply teach OOP principles in CS 2. This will be nice because then Algorithms can easily take its spot. Integrate Git and GitHub into your classes! This is extremely important, as every modern company hiring wants to see the graduates have a great grasp on version control software. Instructor 8 did this while he was here, you all can do it too! Stop letting professors teach subjects they have no business teaching because they don't know enough about the topic, and/or aren't good at explaining concepts. In one semester, a certain professor taught CS 1 using Python, and day one googled how to use Python. The professor was horrible at teaching, let alone speaking. It was a pathetic joke and this scared so many potential new people from the CS major and classes in general. Consider having dedicated "lab" time for intro CS classes, similar to science classes. The courses can still be 3 credits, but one class day every week is dedicated to actually implementing code and helping students get into programming. A common complaint from newer students is that the Professors just read off slides (especially outdated ones they didn't make themselves...), have quizzes and tests related to keywords and definitions, and focus too much on theory, with not enough application. Having a dedicated lab time (perhaps Weds for MWF and R for TR) would help greatly! Stop using outdated textbooks and PowerPoints to teach. Instead,

	<p>use LinkedIn Learning (we all have this for free), YouTube, and other open course materials online. Everything is digital now, and unlike books, the internet will update when new relevant information is released, and older outdated technologies become deprecated. Create a course dedicated to helping juniors and seniors solve common coding technical interview questions. This would be a 300 level course, and would use data structures, algorithms, and discrete math. The textbook is "Cracking the Coding Interview", and the assignments would be on HackerRank or LeetCode. This would help students tremendously pass their technical exams to get jobs, as most modern companies are doing this. Also, this class would be in the CS Core. Be more transparent with your students about what's happening in the CS Department and involve us in those decisions. We are your stakeholders. We are your students. Working together can create a more friendly and cohesive work/school environment for everyone and can eliminate problems like the above much sooner. Make sure at least every 2 years, all professors get briefed on newer technologies so that when they teach they can be on the same page as companies and organizations hiring the students. I could go on, but please, be more human. Not all, but certain professors in the department are notorious for not being understanding and have a rigid demeanor. This is a huge turn off for students and I bet fellow colleagues as well. You have to be good to one another and treat each other like a team, otherwise, we see the bullshit that goes on in the department, and that severely decreases our confidence in the department as well as the school in general."</p>
--	--

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?

MIDDLE STATES COMMISSION ON HIGHER EDUCATION (MSCHE)

Standards for Accreditation and Requirements of Affiliation

An institution of higher education is a community dedicated to students, to the pursuit and dissemination of knowledge, to the study and clarification of values, and to the advancement of the society it serves. The Middle States Commission on Higher Education (MSCHE), through accreditation, mandates that its member institutions meet rigorous and comprehensive standards, which are addressed in the context of the mission of each institution and within the culture of ethical practices and institutional integrity expected of accredited institutions. In meeting the quality standards of MSCHE accreditation, institutions earn accredited status, and this permits them to state with confidence: “Our students are well-served; society is well-served.”

Standard V - Educational Effectiveness Assessment:

Assessment of student learning and achievement demonstrates that the institution’s students have accomplished educational goals consistent with their program of study, degree level, the institution’s mission, and appropriate expectations for institutions of higher education.

Criteria: An accredited institution possesses and demonstrates the following attributes or activities:

1. clearly stated educational goals at the institution and degree/program levels, which are interrelated with one another, with relevant educational experiences, and with the institution’s mission;
2. organized and systematic assessments, conducted by faculty and/or appropriate professionals, evaluating the extent of student achievement of institutional and degree/program goals. Institutions should:
 - a. define meaningful curricular goals with defensible standards for evaluating whether students are achieving those goals;
 - b. articulate how they prepare students in a manner consistent with their mission for successful careers, meaningful lives, and, where appropriate, further education. They should collect and provide data on the extent to which they are meeting these goals;
 - c. support and sustain assessment of student achievement and communicate the results of this assessment to stakeholders;
3. consideration and use of assessment results for the improvement of educational effectiveness. Consistent with the institution’s mission, such uses include some combination of the following:
 - a. assisting students in improving their learning;
 - b. improving pedagogy and curriculum;

- c. reviewing and revising academic programs and support services;
 - d. planning, conducting, and supporting a range of professional development activities;
 - e. planning and budgeting for the provision of academic programs and services;
 - f. informing appropriate constituents about the institution and its programs;
 - g. improving key indicators of student success, such as retention, graduation, transfer, and placement rates;
 - h. implementing other processes and procedures designed to improve educational programs and services;
4. if applicable, adequate and appropriate institutional review and approval of assessment services designed, delivered, or assessed by third-party providers; and
5. periodic assessment of the effectiveness of assessment processes utilized by the institution for the improvement of educational effectiveness.