

SUNY Fredonia
College of Arts & Sciences
Computer and Information Sciences
CIS Assessment Report, AY 2017-2018

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>	
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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 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 CS department has adopted eleven student learning SLOs (SLO's) from ABET website. This selection depends upon which CS/IS track is to be considered suitable for ABET accreditation. Please keep in mind that for Information Systems (IS) track, SLO 'K' is invalid. We have mapped these SLO's to the corresponding Campus Baccalaureate Goals. A list of the CIS department SLO's is displayed initially and then our Program Educational Objectives (PEO) are presented. We reiterate that the same list of SLO's 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 SLO's: the upper SLO is for CS track and the lower one is for IS track of the CIS Department.

The following are the three Program Educational Objectives (PEO's) for our CIS Department:

PEO 1: Pursue successful careers in computer and information science or continue to graduate studies

PEO 2: Utilize strong problem solving and communication skills

PEO 3: Be life-long learners and engage in professional development

- 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]

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 A through J/K are assessed on the basis of courses being taught in CIS Department during each semester and they correlate strongly with our PEO's. Following is a depiction of the relationship between the PEO's and SLO's, and SLO's to the campus baccalaureate goals as prepared by Dr. Zubairi. Table I shows mapping of PEO's to the corresponding SLO's.

Table I: Mapping of PEO's with the corresponding SLO's

SLO →	A	B	C	D	E	F	G	H	I	J	K
PEO1			X						X	X [IS]	X[CS]
PEO2	X	X		X		X				X [CS]	
PEO3					X		X	X		X [IS]	

In Table II, we present mapping of the SLO's that correspond to the SUNY Fredonia campus baccalaureate goals.

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

Student Learning SLOs (SLOs)	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		
G: An ability to analyze the local and				Students study

global impact of computing on individuals, organizations, and society				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. The curriculum map shows a mapping of the courses to one or more corresponding SLO's. In the assessment plan, a number of performance criteria (PC) has been developed for each SLO. The specific courses are identified that satisfy these performance criteria, and consequently are picked for assessment in each semester. For each SLO, a rubric sheet is designed that depicts specific milestones to be achieved by the students to meet or exceed the 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 semester, the Assessment Coordinator identifies the courses to be picked for assessment work and informs the Instructors teaching those courses for which SLO's 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, exams and projects.

Consequently, instructors design/create exams, assignments and projects that include the relevant kind of work to be performed by the students. As the semester progresses, the Instructors are reminded periodically about the collection of assessment data. Finally, at the end of the semester, the Instructors turn in the collected assessment data to the Assessment Chair. Based on the data collected, the pertinent SLO's are assessed. In spring 2018 semester, a list of courses depicted in Table III is assessed, which is based on the curriculum map and the response gotten from the Instructors teaching relevant courses.

Table III: Information of each course, its instructor and SLO's to be assessed for spring 2018

S. No.	Course # & Instructor	Student Learning SLOs (SLOs) To Be Assessed
1.	CSIT201: Zubairi	All Es, & G1, G2
2.	CSIT221: Buzi & Haider	I1
3.	CSIT224: Singh	A2, B3
4.	CSIT231: Szocki	I4
5.	CSIT241 & CSIT242: Maloney	A3
6.	CSIT311 (Not offered this spring 2018 semester)	A4, I2
7.	CSIT321: Hu	I3
8.	CSIT341: Zubairi	A1, A5, B2, & All Js
9.	CSIT425: Scialdone & Zubairi	B1, B4, and All Cs, Ds, Fs, & Ks
10.	CSIT441: Buzi	All Fs
11.	CSIT455: Hu	All Fs
12.	CSIT300, CSIT400, CSIT497 & CSIT499: Arnavut & Buzi	Graduating Senior Exit Survey

In the actual assessment analysis of a given course taught during spring 2018, each SLO being assessed is presented and discussed. In a Table displayed on next page, we present the statement of an SLO to be assessed in first row, followed by its Assessment Method in second row, its Data Source in third row and Assessment Results in the last row. For example, for SLO 'A', we first list its five Performance Criterion (PC) A1 through 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 the final result for the SLO being assessed. Each table entry contains a triplet, (x, y, z), that indicates Exceeds, Meets, Insufficient or Approaching 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. Adding the PC values across multiple courses by columns still results in similar patterns, which preserve the actual results. For presenting the results in categories 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 falls in X, 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. The following three mathematical equations are used to determine X , M and I percentile performance, respectively:

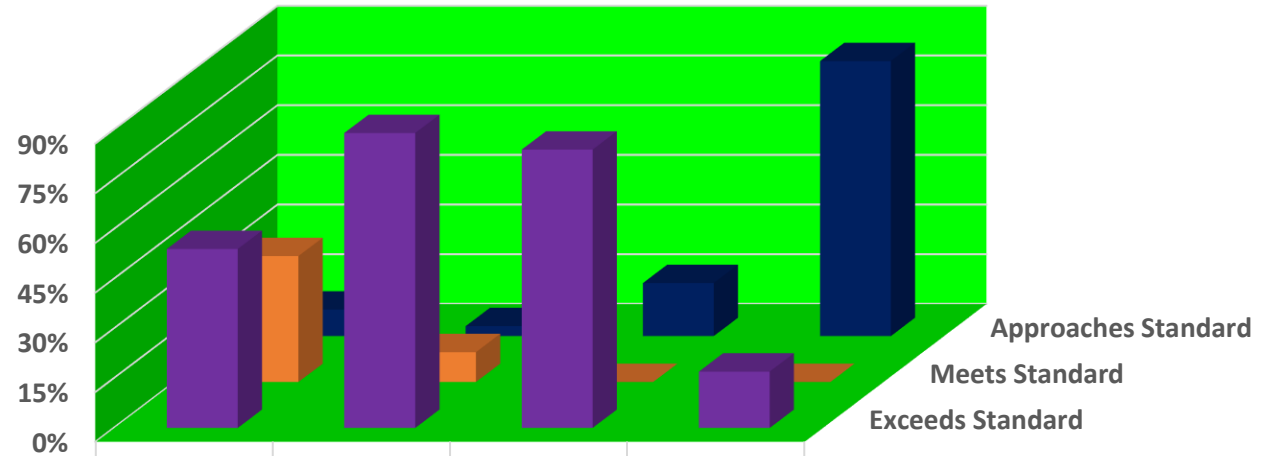
$$X = 100 \times \sum_{j=1}^L [(100 \times \sum_{i=1}^n \frac{PCX_i}{N})] / L \quad (1)$$

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

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

Assessment of Student Learning SLOs (SLOs)																								
Programs: 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)	Instructors assign programs based questions to be developed by CSIT224, CSIT241/242, and CSIT341 students. The programs are thoroughly reviewed and graded by the instructors. The instructors provide the Assessment Committee Chair with a graded portfolio of a number of assignments/Exam questions or project work. The Instructors include specific exams questions in CSIT241, and CSIT341 as per the assessment plan																							
Data Source	Data source is the programs written by students and graded by instructors in CSIT224, CSIT241/242, and CSIT341 as well as some specific exam questions from these three courses to be assessed.																							
Assessment Results	<p>Following are the assessment results as per performance criteria A1, A3 and A5</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>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</th> <th>A1 (DATA)</th> <th>A2 (OBJECT)</th> <th>A3 (DIGITAL)</th> <th>A5 (ALGM)</th> </tr> </thead> <tbody> <tr> <td>CSIT224</td> <td></td> <td>71, 7, 2</td> <td></td> <td></td> </tr> <tr> <td>CSIT241, 242</td> <td></td> <td></td> <td>152, 0, 28</td> <td></td> </tr> <tr> <td>CSIT341</td> <td>13, 9, 2</td> <td></td> <td></td> <td>4, 0, 20</td> </tr> </tbody> </table>				Course	A1 (DATA)	A2 (OBJECT)	A3 (DIGITAL)	A5 (ALGM)	CSIT224		71, 7, 2			CSIT241, 242			152, 0, 28		CSIT341	13, 9, 2			4, 0, 20
Course	A1 (DATA)	A2 (OBJECT)	A3 (DIGITAL)	A5 (ALGM)																				
CSIT224		71, 7, 2																						
CSIT241, 242			152, 0, 28																					
CSIT341	13, 9, 2			4, 0, 20																				

SLO: A1, A2, A3 and A5 Percentile Performance

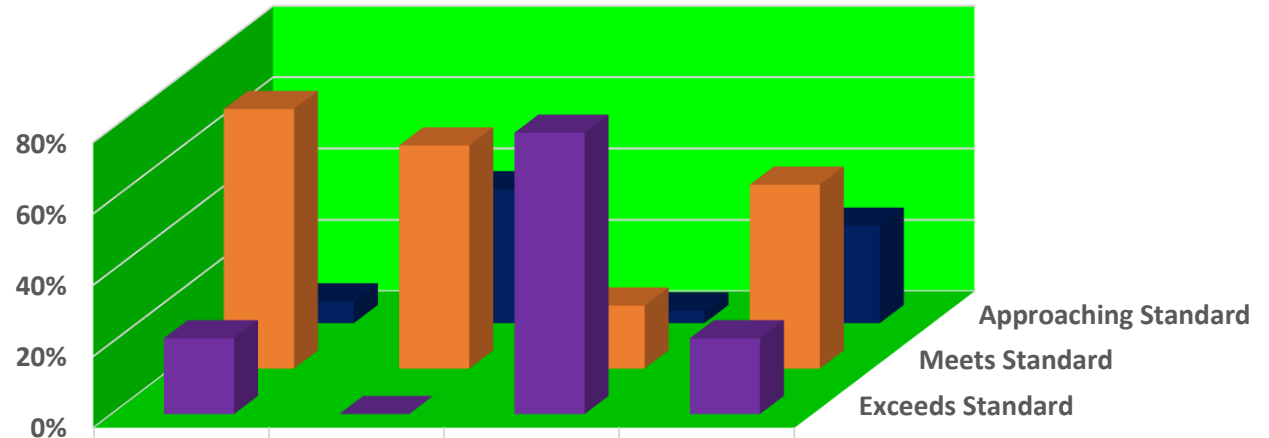


	A1	A2	A3	A5
Exceeds Standard	54%	89%	84%	17%
Meets Standard	38%	9%	0%	0%
Approaches Standard	8%	3%	16%	83%

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 CSIT224, CSIT341 and CSIT425. In CSIT425 course, data were collected on the basis of Final Project, Categories 2 & 3, Items 2, 3, 4 and 5, whereas in CSIT341 data were collected on competency in analyzing some problems and proposing different models for solution and were assigned during the spring 2018 semester. In CSIT224, data were collected on the basis of 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 to develop and design a model for the problem 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	B1 (SPEC)	B2 (ANALYZE)	B3 (APPROPR)	B4 (RESPOURCES)
CSIT224			67, 15, 3	
CSIT341		0, 15, 9		
CSIT425-01, 02	7, 24, 2	7, 12, 2		7, 17, 9

SLO: B1, B2, B3 and B4 Percentile Performance

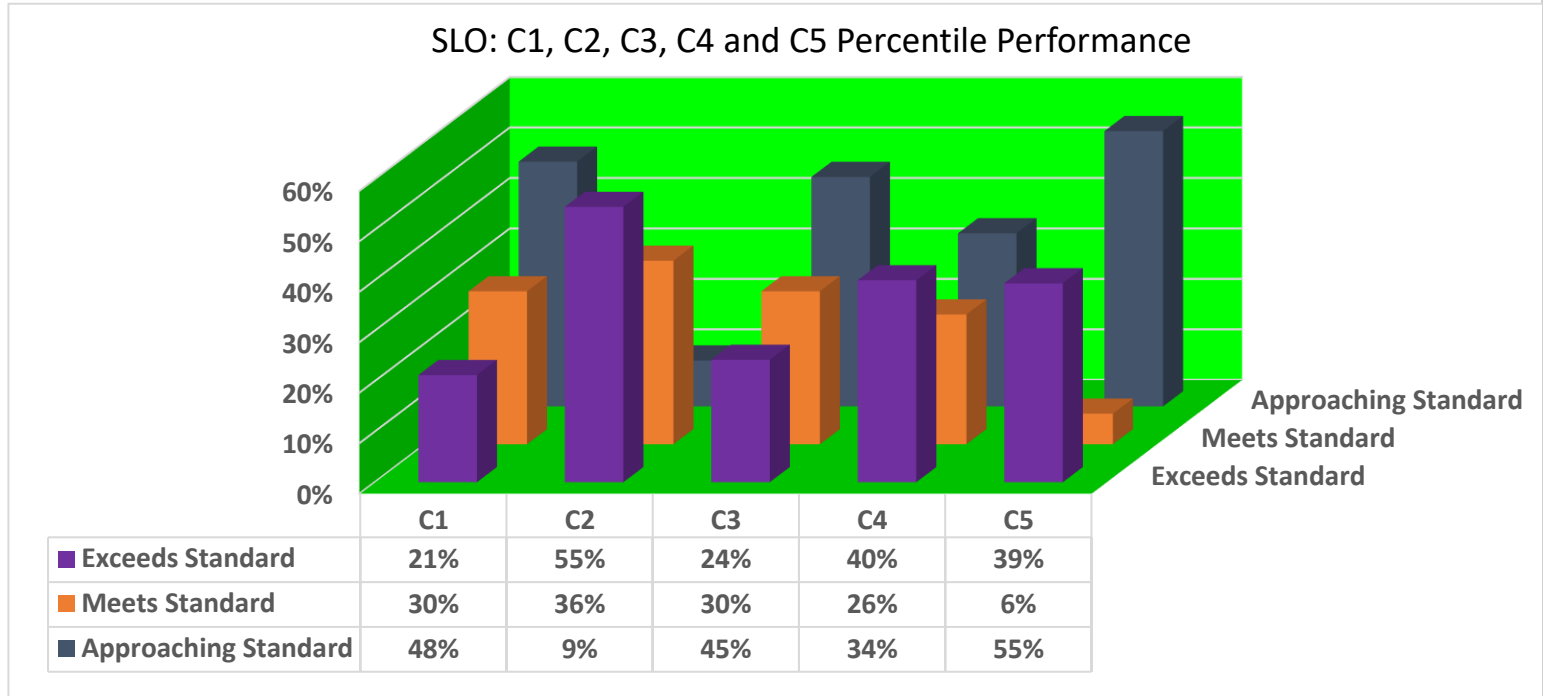


	B1	B2	B3	B4
Exceeds Standard	21%	0%	79%	21%
Meets Standard	73%	63%	18%	52%
Approaching Standard	6%	38%	4%	27%

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	The data was collected by the two Instructors of CSIT425 during spring 2018. One instructor's data collection is based on Final Project assigned to students. Categories 2, 3 & 4, Item 1-4 were used in his project work and the other instructor used data on documenting the work, communicate with team members, writing programs to conform to requirements and to meet deadlines in completion of project work.
Assessment Results	Following are the assessment results as per performance criteria C1 through C5. 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	C1 (DESIGN)	C2 (REQ)	C3 (METRIC)	C4 (TEST)	C5 (OPTIM)
CSIT425-01, 02	7, 10, 16	18, 12, 3	8, 10, 15	14, 9, 12	13, 2, 18

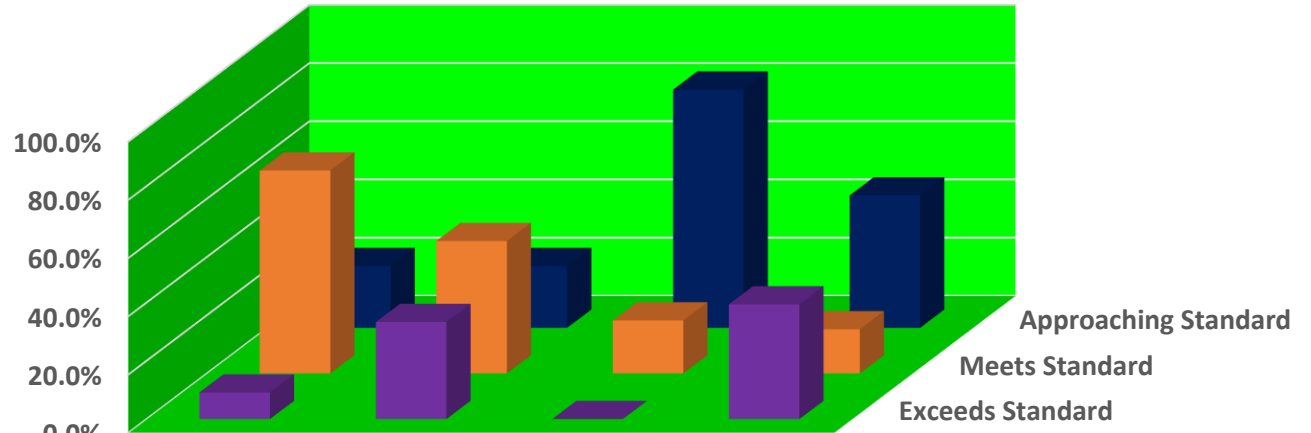


SLO/Goal D:	An ability to function effectively on teams to accomplish a common goal.
Assessment Method(s)	Done through project portfolio and peer evaluations.
Data Source	The data was collected by the two Instructors of CSIT425 on the basis of Final Project. One instructor used group project total, surveys, and submission deadlines measures in data collection. The other instructor employed measures on documenting the work, communicate with team members, writing programs to confirm to requirements and to meet deadlines in completion of project work.
Assessment Results	Following are the assessment results as per performance criteria D1 through D4. 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.
 Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching).

Course	D1 (DOCU)	D2 (INTER)	D3 (VALID)	D4 (DEAD)
CSIT425-01,02	3, 23, 7	11, 15, 7	0, 6, 27	13, 5, 15

SLO: D1, D2, D3 and D4 Percentile Performance



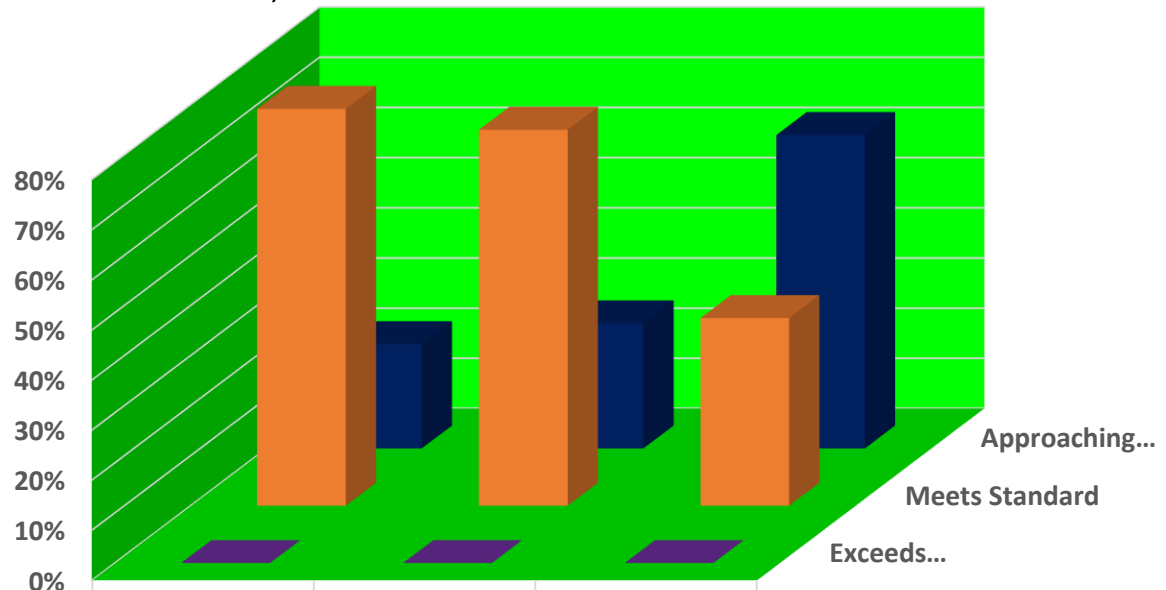
	D1	D2	D3	D4
Exceeds Standard	9.1%	33.3%	0.0%	39.4%
Meets Standard	69.7%	45.5%	18.2%	15.2%
Approaching Standard	21.2%	21.2%	81.8%	45.5%

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 this E SLO/goal is done for CSIT201 course in spring 2018 by the instructor. The instructor picked Q. 1, 2, 7, 8, 9 and 11 from Worksheet # 4 to collect the data.
Assessment Results	Following are the assessment results as per performance criteria E1 through E3. 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 differences between them.

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

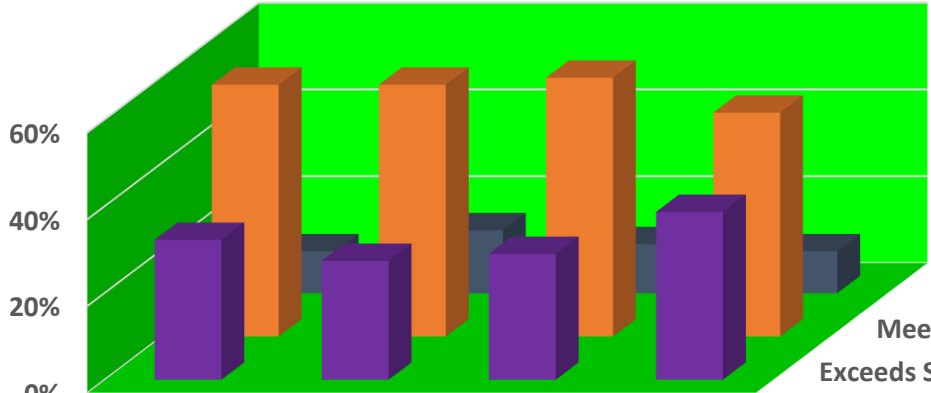
Course	E1 (ETHIC)	E2 (SECUR)	E3 (MAL)
CSIT201	0, 19, 5	0, 18, 6	0, 9, 15

SLO: E1, E2 and E3 Percentile Performance



	E1	E2	E3
Exceeds Standard	0%	0%	0%
Meets Standard	79%	75%	38%
Approaching Standard	21%	25%	63%

SLO/Goal F:	An ability to communicate effectively with a range of audiences.
Assessment Method(s)	In oral communication courses, the students make a number of class presentations. Each presentation is evaluated as per the performance criteria pertaining to this goal. Instructor collects assessment data and forwards it to the assessment Committee Chair.
Data Source	The data collection was done by three Instructors offering CSIT42501, CSIT-02, CSIT441 and CSIT455 courses in spring 2018. 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.
Assessment	Following are the assessment results as per performance criteria (PC) F1 through F4.

Results	<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" data-bbox="430 357 1375 495"> <thead> <tr> <th>Course</th> <th>F1 (VERBAL)</th> <th>F2 (PRESENT)</th> <th>F3 (ORGN)</th> <th>F4 (KNOW)</th> </tr> </thead> <tbody> <tr> <td>CSIT425-01 & -02</td> <td>13, 17, 3</td> <td>5, 19, 9</td> <td>15, 11, 7</td> <td>20, 11, 6</td> </tr> <tr> <td>CSIT441</td> <td>4, 9, 0</td> <td>12, 1, 0</td> <td>3, 10, 0</td> <td>4, 9, 0</td> </tr> <tr> <td>CSIT455</td> <td>3, 10, 3</td> <td>0, 16, 0</td> <td>0, 16, 0</td> <td>2, 12, 2</td> </tr> </tbody> </table> <div data-bbox="430 495 1921 1153"> <p style="text-align: center;">SLO: F1, F2, F3 and F4 Percentile Performance</p>  <table border="1" data-bbox="462 958 1438 1128"> <thead> <tr> <th></th> <th>F1</th> <th>F2</th> <th>F3</th> <th>F4</th> </tr> </thead> <tbody> <tr> <td>Exceeds Standard</td> <td>32%</td> <td>27%</td> <td>29%</td> <td>39%</td> </tr> <tr> <td>Meets Standard</td> <td>58%</td> <td>58%</td> <td>60%</td> <td>52%</td> </tr> <tr> <td>Approaching Standard</td> <td>10%</td> <td>15%</td> <td>11%</td> <td>10%</td> </tr> </tbody> </table> </div>	Course	F1 (VERBAL)	F2 (PRESENT)	F3 (ORGN)	F4 (KNOW)	CSIT425-01 & -02	13, 17, 3	5, 19, 9	15, 11, 7	20, 11, 6	CSIT441	4, 9, 0	12, 1, 0	3, 10, 0	4, 9, 0	CSIT455	3, 10, 3	0, 16, 0	0, 16, 0	2, 12, 2		F1	F2	F3	F4	Exceeds Standard	32%	27%	29%	39%	Meets Standard	58%	58%	60%	52%	Approaching Standard	10%	15%	11%	10%
Course	F1 (VERBAL)	F2 (PRESENT)	F3 (ORGN)	F4 (KNOW)																																					
CSIT425-01 & -02	13, 17, 3	5, 19, 9	15, 11, 7	20, 11, 6																																					
CSIT441	4, 9, 0	12, 1, 0	3, 10, 0	4, 9, 0																																					
CSIT455	3, 10, 3	0, 16, 0	0, 16, 0	2, 12, 2																																					
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Approaching Standard	10%	15%	11%	10%																																					
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 in spring 2018, so that data analysis on G SLO could be performed and reported in current assessment report. The instructor picked Q. 3, 4, and 5 from Worksheet # 4 specially designed to collect the data on this SLO.																																								

Assessment Results

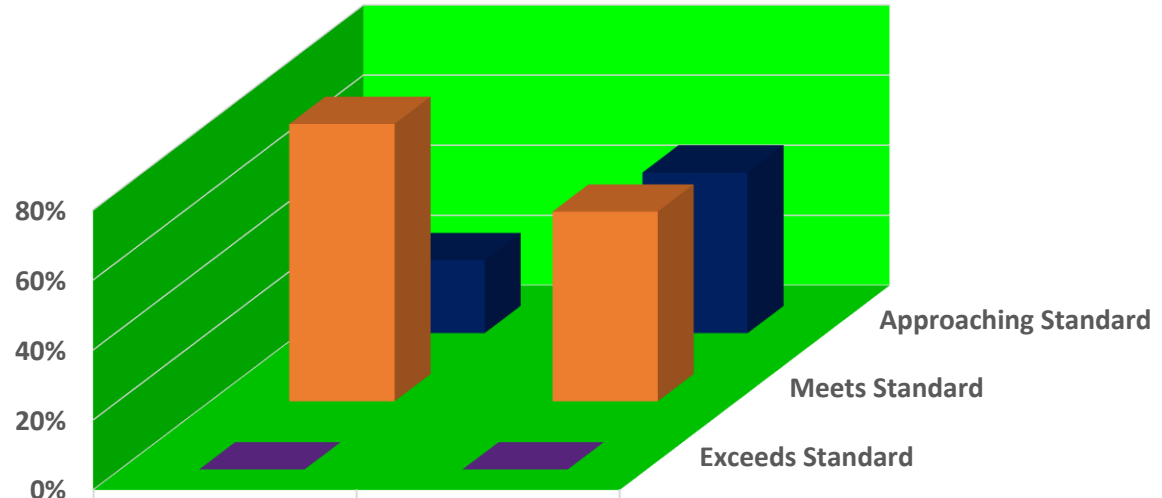
Following are the assessment results as per performance criteria G1 through G2.

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.

Each triplet x, y, z indicates (exceeds, meets, insufficient or approaching) percentile performance of each LO.

Course	G1 (IMPACT)	G2 (SOCIETY)
CSIT201	0, 19, 5	0, 13, 11

SLO: G1 and G2 Percentile Performance



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	The data was collected by the three Instructors offering CSIT221-01 & CSIT221-02, CSIT231 and CSIT321 courses on I1, I3 and I4, respectively, during spring 2018. 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. Since CSIT311 course was not offered during spring 2018, and therefore, no data was collected on Assembly Language for

	SLO, I2.																																				
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> <p>Each triplet (x, y, z) indicates (exceeds, meets, insufficient or approaching).</p> <table border="1"> <thead> <tr> <th>Course</th> <th>I1 (C++)</th> <th>I2 (ASSEMB)</th> <th>I3 (OTH)</th> <th>I4 (LINUX)</th> </tr> </thead> <tbody> <tr> <td>CSIT221-01, CSIT221-02</td> <td>8, 20, 19</td> <td></td> <td></td> <td></td> </tr> <tr> <td>CSIT321</td> <td></td> <td></td> <td>7, 16, 8</td> <td></td> </tr> <tr> <td>CSIT231</td> <td></td> <td></td> <td></td> <td>12, 103, 41</td> </tr> </tbody> </table> <p style="text-align: center;">SLO: I1, I3 and I4 Percentile Performance</p> <table border="1"> <thead> <tr> <th></th> <th>I1</th> <th>I3</th> <th>I4</th> </tr> </thead> <tbody> <tr> <td>Exceeds Standard</td> <td>17%</td> <td>23%</td> <td>8%</td> </tr> <tr> <td>Meets Standard</td> <td>43%</td> <td>52%</td> <td>66%</td> </tr> <tr> <td>Approaching Standard</td> <td>40%</td> <td>26%</td> <td>26%</td> </tr> </tbody> </table>	Course	I1 (C++)	I2 (ASSEMB)	I3 (OTH)	I4 (LINUX)	CSIT221-01, CSIT221-02	8, 20, 19				CSIT321			7, 16, 8		CSIT231				12, 103, 41		I1	I3	I4	Exceeds Standard	17%	23%	8%	Meets Standard	43%	52%	66%	Approaching Standard	40%	26%	26%
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Approaching Standard	40%	26%	26%																																		
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 CSIT341 as CSIT311 was not offered during spring 2018. The instructor picked Q. 1 from HW # 4, Q. 2 from HW # 1 and Q. 2 from Worksheet # 4 to collect the data in spring 2018.																				
Assessment Results	<p>Following are the assessment results as per performance criteria J1 through J4.</p> <p>Performance Criteria</p> <p>J1. (MODEL) Demonstrates an ability to apply mathematical modeling to computing problems</p> <p>J2. (ALGM) Demonstrates an ability to develop different algorithms for a computing problem</p> <p>J3. (EFFIC) Demonstrates an ability to evaluate algorithm efficiency</p> <p>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</th> <th>J1 (MODEL)</th> <th>J2 (ALGM)</th> <th>J3 (EFFIC)</th> <th>J4 (MEMORY)</th> </tr> </thead> <tbody> <tr> <td>CSIT341</td> <td>0, 16, 8</td> <td>0, 12, 12</td> <td>0, 14, 10</td> <td>0, 14, 10</td> </tr> </tbody> </table>	Course	J1 (MODEL)	J2 (ALGM)	J3 (EFFIC)	J4 (MEMORY)	CSIT341	0, 16, 8	0, 12, 12	0, 14, 10	0, 14, 10										
Course	J1 (MODEL)	J2 (ALGM)	J3 (EFFIC)	J4 (MEMORY)																	
CSIT341	0, 16, 8	0, 12, 12	0, 14, 10	0, 14, 10																	
<p>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 Standard</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>Meets Standard</td> <td>67%</td> <td>50%</td> <td>58%</td> <td>58%</td> </tr> <tr> <td>Approaching Standard</td> <td>33%</td> <td>50%</td> <td>42%</td> <td>42%</td> </tr> </tbody> </table>			J1	J2	J3	J4	Exceeds Standard	0%	0%	0%	0%	Meets Standard	67%	50%	58%	58%	Approaching Standard	33%	50%	42%	42%
	J1	J2	J3	J4																	
Exceeds Standard	0%	0%	0%	0%																	
Meets Standard	67%	50%	58%	58%																	
Approaching Standard	33%	50%	42%	42%																	
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 CSIT425 in spring 2018. 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. Other 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.

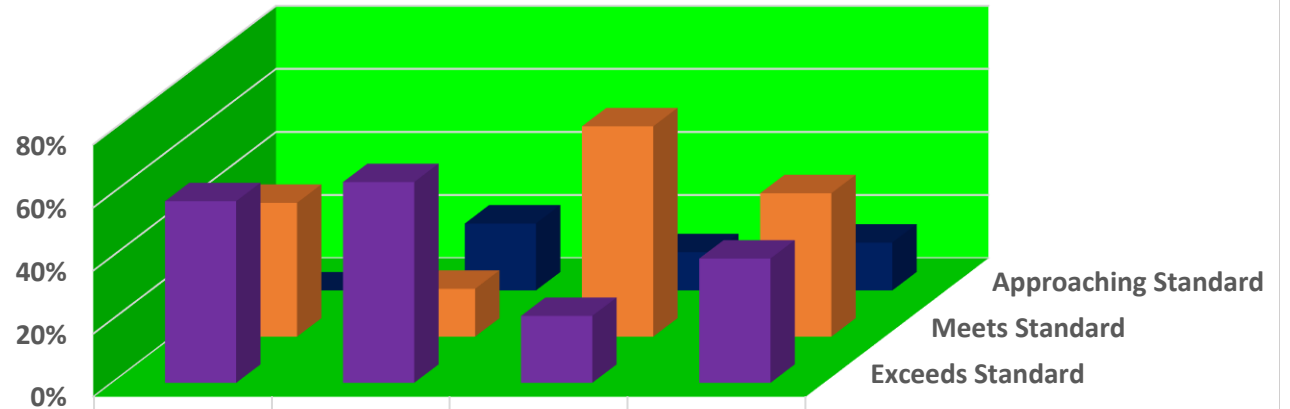
Performance Criteria

- 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	K1 (FORMAL)	K2 (ESTIM)	(K3 PLAN)	K4 (DOCU)
CSIT425-01 & -02	19, 14, 0	21, 5, 7	7, 22, 4	13, 6, 5

SLO: K1, K2, K3 and K4 Percentile Performance



	K1	K2	K3	K4
Exceeds Standard	58%	64%	21%	39%
Meets Standard	42%	15%	67%	45%
Approaching Standard	0%	21%	12%	15%

SLO/Goal H:

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

Assessment

In past, the Department Secretary and Dr. Singh invited and encouraged the graduating students to fill out a hard copy of the attached survey

Method(s)	<p>(Appendix I). The chair also reminded the faculty to identify the graduating students and ask them to fill out anonymously the exit survey. Chair also reminded the faculty members to send the collected data to Dr. Singh before a deadline date set by him.</p> <p>In spring 2018, this 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 spring 2018 were requested to fill out senior exit survey before/on a deadline date set by Dr. Singh. This anonymous and indirect technique would help us to refine the CIS curriculum, and consequently, the assessment report during future data collection and analysis work.</p>
Assessment Results	<p>The data is collected by the department secretary is forwarded to the Assessment Coordinator. I am pleased to state that sixteen senior students participated in senior exit survey during spring of 2018. Nine students were Computer Science (CS) majors and remaining seven senior students were Information Systems (IS) majors. Nine students could major in eight semesters. Six students majored in less than six semesters at Fredonia University. Only one student majored in nine semesters. Among sixteen senior students, four students were transfer. The students transferring to Fredonia from another school or transferring from another major have already earned 30-75 credits. Consequently, this category of students spent on the average two/three years for graduating at Fredonia University. Positive and negative feedback from senior students will be discussed below in conclusions section of this assessment report.</p>
Conclusions	
<p>Have you had an opportunity to discuss these results within your department? If so, what form did this take?</p> <p>What conclusions were drawn about student learning as a result of their assessment efforts?</p>	<p>The above reported results 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 spring 2018 semester and providing them with a tailor-made rubric for recording the assessment data correctly. The first department meeting to be held during beginning of Fall 2018 semester so as to take care of proper steps to enhance the quality of collected data especially for the five courses CSIT201, CSIT221, CSIT231, CSIT341 and CSIT425 by the respective instructors teaching these courses in fall 2018.</p> <p>This assessment report represents a systematic study of compiled results of assessment data collected for eleven SLOs: A, B, C, D, E, F, G, H, I, J and K during spring 2018 semester. As told by Dr. Zubairi that he was instrumental in developing the relevant equations to aggregate the assessment data in past. These equations have been rewritten elegantly in mathematical form by Dr. Singh. Dr. Singh, collected the assessment data from several Instructors and processed the raw data using MS Excel software version 2016 to arrive at the final conclusions. Almost all Instructors have cooperated and provided assessment data in a timely manner. We believe that the assessment of eleven ABET SLOs just in one semester is itself a great achievement, given the fact that most of full-time faculty in the department was busy in hiring one new faculty during AY 2017-18. Additionally, Dr. Singh being full-time continent faculty in the CIS department has exceptionally tremendous teaching and service load.</p> <p>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 ten SLO's investigated in the current study except for all J1, J2, J3 and J4 for CSIT341 course, where all SLOs are below 70%, but particularly for J2, J3 and J4 percentile performance is below 50%. For most of SLOs, we obtain percentile performance in the range of 70-100%. However, there are several SLOs, e.g., pair A5 & B2 for CSIT341; quadruple C1, C3, C4 and C5 for CSIT425; pair D3 & D4 for CSIT425; pair E3 & G2 for CSIT201; and I1 for CSIT 221 are really very low in percentile performance (only 40%), which has to be improved in future data collection and course offerings in fall 2018. We conclude that more data collection is definitely required to improve upon the percentile performance of several SLOs as listed</p>

above to close the loop. This important issue has to be included and discussed in the first faculty meeting to be held in August/September 2018.

At the end of this 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, one senior who responded to Senior Exit Survey gave perfect score of 5/5. Four students rated 4/5 points and remaining eleven students rated the department in a scale of 2 - 3. The overall average of the department rating is 3.1/5.0. Eight students took internships and independent study courses. Out of several independent study/senior project/internship courses listed in exit survey by senior students, the most listed courses were CSIT300 and CSIT499, followed by CSIT496 and CSIT497. Senior students listed around 50 very useful courses being currently offered in the CIS department. Among these courses, the following courses were listed to be very useful: CSIT107, CSIT151, CSIT201, CSIT203, CSIT207, CSIT224, CSIT291, CSIT307, CSIT333, CSIT335, CSIT341, CSIT435, CSIT441, CSIT425, CSIT455, and CSIT463.

One Senior student commented, "We need more availability of computers/labs for CSIT courses. There were too many times to count that my classes should've been taken in a lab where it was taught in a classroom. You can't learn practical Computer Science in a classroom." Another Student made these comments, "The wide variety of term projects and seminars were helpful."

Here are some plus points cited by senior students in exit survey about the department and its faculty:

1. The CIS department seems nice and tries to provide lots of opportunities for students to grow outside of class.
2. Several students were able to attend conferences, seminars and workshops to broaden their knowledge.
3. Five senior students already have a job offer in a CS/CIS related field.
4. Seven students are expecting to join the graduate school in very near future.
5. The accessibility rating of CIS department faculty is extremely good: 4/5 points.
6. The senior students were very satisfied with the access to workspace labs and equipment required for their coursework.
7. The web program here is great and the professor is intelligent and modern.

Here are some adverse remarks made by senior students:

1. Department needs to update the curriculum for CS courses since many of the practices or basics being taught are outdated or not applicable in most current CS related positions. Only jobs that a CS degree truly sets you up for is an entry level software developer's job, if one is lucky. Otherwise, one has to become self-taught in a particular discipline.
2. Also, there is need to fire one instructor - I've heard students in my class complain about her for the past two semesters, and was by far the worst professor I've had here at Fredonia.
3. Many professors here are outdated. I've tried going to many professors to advance my education in past what we learned in class, but to no avail.
4. Since web programmer professor worked another job, he was never available to advance my knowledge on the subject.
5. The majority of the upper level professors are not good teachers. They are hard to follow and almost all of them read straight from the ppt. slides in class.

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 SLO 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?
