

BS in Computer Science Program Assessment Report for Year 2016

Assessment Committee
Spring 2017

Dear BSCS program stakeholders,

In our efforts to continually improve the BSCS program for our students, the CS faculty have been dedicating time and effort to understanding our students' performance across the entire program. For 2016 assessment Cycle, the CS faculty collected data on five program educational objectives of the BSCS program:

1. Students will be able to apply the principles of computer science, mathematics, and scientific investigation to solve real-world problems appropriate to the discipline.
2. Students will have lifelong learning skills, which will allow them to successfully adapt to evolving technologies throughout their professional careers.
3. Students are sufficiently prepared for employment and advanced studies, and will have significant experiences with complex software development for real-world problems.
4. Students will have sufficient teamwork, communication, and interpersonal skills to enable them to work with others effectively in their professional careers.
5. Students can function ethically and responsibly, and are conscious of ethical, social, global, legal, security and professional issues related to computing.

These objectives reflect our BSCS program mission:

The mission of the Computer Science B.S. program is to provide undergraduate students with a strong foundation in both Computer Science theory and programming practice that is necessary to solve real-world engineering problems. Through the use of state of the art software and hardware students will learn to develop their theoretical and programming skills in order to allow them to apply these learned techniques to analyze a problem, evaluate possible solutions, and create a solution as part of a program development team. The program prepares students for engineering careers in software design, intelligent systems, big data systems and analytics, computer systems and network design, software system security, and bioinformatics. Graduates will be prepared to take positions in these areas in academia, industry and government, the local community, and will be prepared future for graduate studies in Computer Science as well. In addition the program provides students with opportunities to interact with other professional institutions and exhibit the highest ethical standards in the practice of their profession.

Information about our program's success at helping students to achieve these goals comes from Homework's, Exams, Quizzes, Projects, Presentations, Papers, etc. assigned to our CS students in upper level CS courses in which Introduce, Development, and Mastery of the outcome are expected. Our CS faculty collected these assignments as part of normal class requirements each term. The CS faculty use course learning outcomes (CLOs) grading rubric. The CLOs are mapped to the program learning outcomes listed above thru ABET student outcomes (a-k):

- 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 realistic 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 practices.
- 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.
- k. An ability to apply design and development principles in the construction of software systems of varying complexity.

These students outcomes are related to the knowledge, skills, and behaviors that students acquire as they progress through the program. The mapping is important to our program as the CS department prepare for ABET accreditation in Fall 18.

Scores of each grading rubric for these assignments will serve as the data for this assessment. Because the points possible may vary across classes, all scores will be reported as a percentage for the purposes of program assessment. We defined four levels of performance: {1} Inadequate, {2} Approaches Standard, {3} Meets Standard, and {4} Exceeds Standard. In evaluating course rubric the bar is set at the level of Meets Standard or Exceeds Standard. For each course rubric, if the percentage of meeting standard or exceeding standard is 70% or more, the targeted objective is met.

The Undergraduate Committee reviewed students' performance in this assessment during their monthly meeting in Winter 17.

In the last section of this report, we summarized the assessment results and the action plans taken by the Undergraduate Committee to improve the BSCS program.

Assessment Results:

The assessment results for all five learning objectives are shown in the below table. The score of the first three objectives across multiple courses is about 75%; while the score of the last two objectives is about 80%. These scores are higher than last year's scores and they all meet the targeted objectives.

PEO	1	2	3	4	5
% Met PEO	76%	75%	76%	79%	79%

Program Action Plan

To enhance the CS program and improve it much farther, the Undergraduate Committee will mentor and improve the following areas during the next assessment cycle 2017:

- PEO1: Applying mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems. In particular, Number Theory, Propositional Logic, Asymptotic notations, and Sequences and Summations will be monitored in CSC 1500 (Fundamental Structures - discrete mathematics and its applications) and CSC 2200 (Computer Science II- data structure and algorithm analysis). The assessment committee will assess these lower level courses for the first time in the next assessment cycle.
- PEO2: Students' Self-Learning ability. In particular students will be encouraged to learn new technologies that best suit their interest and the need of industry. Advanced level courses such as CSC 4996 (Senior Project) and CSC 4710 (Information Systems Design – database system system) give students the opportunity to work on semester long projects. The instructors of these two classes will encourage the students to bring up their own ideas, write project proposals, and motivate them to explore and learn different technologies for those projects.
- PEO3: Applying design and development principles in the construction of software systems of varying complexity. In particular, Software requirements, test cases, UML, Software engineering principle, and database design and implementation. In addition to the required courses CSC 4110 (Software Engineering) and CSC 4710, the advising office will encourage students to take an elective course that enhance their knowledge in the above topics. The Computer Science Department offered such a class in the past (CSC 5991 - Introduction to Software Architecture) but the course was not recommended to the undergraduate students and it was offered in Spring Summer term only. The Undergraduate Committee will recommend this course to the Chair and ask him to offer it at least once every academic year. CS advisers will advise students to take this Course prior to CSC 4996 (Senior Project).
- PEO4: Teamwork, communication, and interpersonal skills. High level courses such as CSC 4710 and CSC 4996 have large scale final project that require students to work in teams. The instructors of these courses will ask the students to form groups “early” in the semester so that they get more time to interact and work as a team. The students will be encouraged to setup project repositories using a repository such as Github.
- PEO5: Ethics and responsibilities of the computer professionals, social, global, legal, and security issues related to computing. Ethics topics are taught in CSC 4996 during senior year college. Because most lectures in CSC 4996 are devoted to the senior project so little time left to cover all topics extensively, the Undergraduate Committee proposed a new course in Ethics (CSC 3010 - Ethics in Computer Science) in Winter 16 ; the course was approved in Fall 16. The Computer Science department will offer this course each term starting in Fall 2017.

If you have questions about this report, you may “reply” to Dr. Reynolds and he will respond to your questions as soon as possible.

With great appreciation for our students and our program’s supporters,

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