

Bachelor of Science with a Major in Computer Science

Assessment Committee: Dr. Robert Reynolds, Dr. Thaeer Jayyousi, Dr. Loren Schwiebert, Stephanie Chastain, and Olubukola Akintoroye

(Note: The other two Computer Science Programs, BA IST and BA CS, both include Program Learning Outcomes that are similar but less constraining than the BSCS program. Therefore, the results for the assessment of the BSCS program will also reflect the performance of those two programs as well. However, the number of students enrolled in those programs is too small to allow adequate statistical assessment as we have done for the BSCS program. In fact, the size of these two programs is small enough that individual student performance could be identified if assessed on their own.)

Dear Computer Science undergraduate students and Supporters:

In our mission to continuously improve the Computer Science B.S.CS. program over the past year, the Department of Computer Science Assessment Committee collected information about the ongoing activities in our Department in the area of Undergraduate Education. The period over which the data used in this report was collected spanned from 9/1/2015 to 8/31/2016. Further data collection activities for Fall 2016 and Winter 2017 are currently underway. This task could only have been done with the full cooperation of Faculty, Lecturers, Part-Time Instructors, Graduate Teaching Assistants, Students, and Staff.

The data was collected in regard to five important Program Learning Outcomes (PLO) that were identified by our Faculty. They are:

1. (PLO 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. (PLO 2) Students will have lifelong learning skills which will allow them to successfully adapt to evolving technologies throughout their professional careers.
3. (PLO3) Students are sufficiently prepared for employment and advanced studies, and will have significant experiences with complex software development for real-world problems.
4. (PLO4) Students will have sufficient teamwork, communication, and interpersonal skills to enable them to work with others effectively in their professional careers.

5. (PLO 5) Students can function ethically and responsibly, and are conscious of ethical, social, global, legal, security, and professional issues related to computing.

The information used to assess the accomplishments of students in the B.S. CS program come from the following course requirements that all BSCS students need to satisfy in order to receive their degree. These courses are as follows: CSC 3100/01, CSC 3110, CSC 4110/11, CSC 4420/21, CSC 4500, and CSC 4996/97. The data for each class came from exams, quizzes, presentations, and projects. The analysis of the resultant data produced the following observations with regard to each of the PLOs mentioned above:

1. (PLO 1) This fundamental PLO that relates to the application of scientific principles in problem solving was initially assessed in the Spring/Summer of 2015. Those materials used to assess the course learning outcomes (CLOs) associated with PLO 1 were used. At that time, the average percentage score of all students summed over all of the assessed classes was 62%. That was the baseline from which our assessment began in the fall of 2015. It was expected that the average performance should exceed 70%. So the initial assessment was below expectations.

For the fall term the average had increased to 70% which just met expectation and was an improvement over the first pass. In the following winter term, percentage increased to 76% which exceeded expectations.

These improvements resulted from actions taken in the fall of 2015 based upon the Spring/Summer classes. Those actions included the following:

- a. Training of all faculty, lecturers, and GTAs on the assessment practices of the Department each term.
 - b. Associating a Full Time Faculty mentor with each course to standardize the syllabus and textbooks across all sections for a course, synchronize activities between the lecture and the labs, and revise course learning outcomes when appropriate.
 - c. Submission of assessment material by faculty was automated so that checks for missing items would be easier to do for the Assessment committee.
 - d. The development of a more precise correspondence or **mapping** between the course learning outcomes (CLOs) and Program Learning Outcomes (PLOs) to make a more precise assessment possible.
2. (PLO 2) Those CLOs associated with PLO 2, learning skills needed for lifelong learning, were used for this assessment. For the fall term the average over all students was 78% which was above expectations. In the winter of 2016 the average performance was 84% for students with respect to aspects of the class that related to PLO2.

This PLO was more easily met by the students since they come into the program with learning goals often already in place. So no actions were felt necessary.

3. (PLO 3) This PLO assessed student preparations for employment and advanced studies. For the fall of 2015 the average student performance on those materials that assessed course learning outcomes relative to PLO 3 was 70%. That result met the expected outcome of 70%. Since this outcome is a reflection of the maturity of the students, it is one that will still be under development as these courses progress. So an initial value for a first time measurement was felt to be a success.

In the following winter term the results increased to 76%. That is, the average student's performance on those CLOs associated with this PLO in all of the courses measured is 76%. That was an increase over the previous term and met and exceeded expectations.

There were no specific action plans for this PLO based upon the outcomes here. Although there are plans to make Faculty research and projects more visible to the students on the website so as to encourage interest in this PLO.

4. (PLO 4) This PLO focused on issues of teamwork, communication, and interpersonal skills. Again it was assessed in terms the performance of students on the related course learning outcomes associated with this PLO. In the fall approximately the average score for students on the course activities associated with this PLO was 78%. In the winter term the average performance on course activities that reflected this PLO was 87%, up almost 10% from the previous term. As a result the score was viewed as greatly exceeding expectations.

The results for this PLO did not suggest that any new action items needed to be introduced at this time.

5. (PLO 5) This PLO focused on those portions of each course (CLOs) that reflected this PLO in the course map. In the fall students scored a 75% on those course aspects associated with this PLO. As such it met and exceeded our expectation. In the following term the performance increased to 85%, an improvement of 10%. This result greatly exceeded our expectation.

As a result no specific action plan was set in place for this PLO. This was in part due to the fact that the Department recently added specific materials into the sequence to address this important issue. So this improvement should reflect those changes.

In summary, the most fundamental PLO was that associated with the principles of scientific investigation as supported by computer science and mathematics. This PLO is the basis for the whole program's success. It was initially observed to be approaching expectations when first observed in the Spring/Summer of 2015. As a result, certain actions were put in place in the fall that produced subsequent improvements during the fall and winter terms respectively. By the end of the winter term student performance on this had exceeded expectations. This improvement was due in part to improved training for faculty in how to make assessment

decisions, and more faculty involvement in the coordination and synchronization of multiple sections and labs.

We feel that these improvements that were made directly in response to PLO 1 also positively impacted the program's performance on the other 4 PLOS as well, producing continuous improvements in each over the course of the assessment period.

With great appreciation for all of our students, and program supporters,

Dr. Robert G. Reynolds, Thaer Jayyousi, Loren Schwiebert (Interim Chair), Stephanie Chastain (advising staff), and Olubukola Akintoroye (student assistant).