

CPSC Department Assessment Plan

17 Sept 2018

Introduction

Purpose

This plan details the activities to assess the achievement of outcomes for the Computer Science and Security Programs.

Assessment Plan Goals:

1. Establish continuous, sustained communication with our stakeholders
2. Provide a feedback mechanism for improving our curriculum, teaching methods, and facilities
3. Continually refine our assessment methods
4. Support ongoing accreditation programs (ABET, Middle States, etc).

Program Objectives and Student Outcomes

Program Objectives for BS in Computer Science

By 3-5 years after graduation, most graduates of the Computer Science program will:

1. Be employed in a computing-related field or be pursuing graduate studies;
2. Have advanced their skills and knowledge since completing the program.

Program Objectives for BS in Computer Security

By 3-5 years after graduation, most graduates of the Computer Security program will:

3. Be employed in a computer security-related field or be pursuing graduate studies;
4. Have advanced their skills and knowledge since completing the program.

Student Outcomes for BS in Computer Science

The program enables students to achieve, by the time of graduation:

- 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.

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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.

Student Outcomes for BS in Computer Security

The program enables students to achieve, by the time of graduation:

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 and security 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 computer security practice.

j) An ability to apply mathematical foundations, algorithmic principles, and computer security 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.

Mapping of Student Outcomes to Program Objectives

(see next pages)

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**Mapping of Student Outcomes to Program Objectives
BS in Computer Science**

This table shows the mapping of how each Student Outcome supports one or both of our Program Objectives. Thus, by achieving Student Outcomes during the course of their education, program objectives are attained by our students

Program Objectives for BS in Computer Science

		1.	2.
		By 3-5 years after graduation, most graduates of the Computer Science program will be employed in a computing-related field or be pursuing graduate studies.	By 3-5 years after graduation, most graduates of the Computer Science program will have advanced their skills and knowledge since completing the program.
Student Outcomes for BS in Computer Science			
a)	An ability to apply knowledge of computing and mathematics appropriate to the discipline	X	X
b)	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution	X	X
c)	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs	X	
d)	An ability to function effectively on teams to accomplish a common goal	X	
e)	An understanding of professional, ethical, legal, security and social issues and responsibilities		X
f)	An ability to communicate effectively with a range of audiences	X	
g)	An ability to analyze the local and global impact of computing on individuals, organizations, and society		X
h)	Recognition of the need for and an ability to engage in continuing professional development	X	X
i)	An ability to use current techniques, skills, and tools necessary for computing practice.	X	X
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.	X	
k)	An ability to apply design and development principles in the construction of software systems of varying complexity.	X	

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**Mapping of Student Outcomes to Program Objectives
BS in Computer Security**

This table shows the mapping of how each Student Outcome supports one or both of our Program Objectives. Thus, by achieving Student Outcomes during the course of their education, program objectives are attained by our students

Program Objectives for BS in Computer Security

		1.	2.
		By 3-5 years after graduation, most graduates of the Computer Security program will be employed in a computing security-related field or be pursuing graduate studies.	By 3-5 years after graduation, most graduates of the Computer Security program will have advanced their skills and knowledge since completing the program.
Student Outcomes for BS in Computer Security			
a)	An ability to apply knowledge of computing and mathematics appropriate to the discipline	X	X
b)	An ability to analyze a problem, and identify and define the computing and security requirements appropriate to its solution	X	X
c)	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs	X	
d)	An ability to function effectively on teams to accomplish a common goal	X	
e)	An understanding of professional, ethical, legal, security and social issues and responsibilities		X
f)	An ability to communicate effectively with a range of audiences	X	
g)	An ability to analyze the local and global impact of computing on individuals, organizations, and society		X
h)	Recognition of the need for and an ability to engage in continuing professional development	X	X
i)	An ability to use current techniques, skills, and tools necessary for computer security practice.	X	X
j)	An ability to apply mathematical foundations, algorithmic principles, and computer security theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.	X	
k)	An ability to apply design and development principles in the construction of software systems of varying complexity.	X	

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Process for the Establishment and Revision of the Student Outcomes

At the annual assessment meeting described in Criteria 2.E. of this Self Study, the faculty of our department meets to consider assessment data at the course and program level. The department takes a holistic view of Student Learning Outcomes (SLOs), Student Outcomes, and Program Objectives. Each of these outcomes/objectives are linked. As such, the discussion at the annual assessment meeting encompasses all of these outcomes/objectives.

During the annual assessment meeting, the faculty also reviews SLOs for individual courses. Additional discussion of specific SLOs occurs during regular department curriculum meetings (these meetings occur throughout the academic year, focusing on any changes to the program's curriculum). During conversations at these meetings, individual faculty that teach specific courses, or lead faculty in concert with other faculty that teach common courses, may propose revision to course-level SLOs. Final adoption of any SLO changes must be approved by majority vote of the faculty in the department.

The underlying focus of all of these discussions is to nest course-level SLOs within Student Outcomes for the program, nest Student Outcomes within Program Educational Objectives, and nest Program Objectives within the university's mission and vision statements. Our assessment discussion then seeks to enlighten the larger conversation on how well our program is meeting/supporting the university's mission/vision statement. This support is measured by mapping course-level SLOs with Student Outcomes and Program Objectives and aligning our Student Outcomes and Program Objectives with the university's mission and vision statements. Several data points are used to inform this discussion, to include:

- Student performance on individual course-level SLOs
- Aggregated student performance on Student Outcomes (measured through the mapping of course SLOs to Student Outcomes)
- Results of surveys completed by graduating students, speaking to the appropriateness of program outcomes, objectives, and required skills
- Results of surveys completed by student interns, speaking to the appropriateness of program outcomes, objectives, and required skills
- Results of surveys completed by employers/supervisors of our student interns, speaking to the appropriateness of program outcomes, objectives, and required skills
- Results of surveys completed by our alumni, speaking to the appropriateness of program outcomes, objectives, and required skills
- Results of feedback from our department annual assessment report (a report submitted to the university assessment committee)

Based on the data/information received from the above feedback, a number of possible outcomes are possible from the department's annual assessment meeting, to include:

- Revision of course-level SLOs
- Revision of course-level assessment methods or instruments
- Revision of Student Outcomes
- Revision of Program Educational Objectives

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- Revision of material, topics, breadth, or depth of content within specific courses
- Revision of curriculum for the program

At the annual department assessment meeting, the faculty considers each outcome and objective. Reports are prepared and submitted to the faculty prior to this meeting. Any revision to current SLOs, Student Outcomes, or Program Educational Objectives must be approved by majority vote of the faculty of the department.

Data Collection and Assessment Activities

The two tables below summarize the tools we use for assessment, showing:

- the frequency of assessment and expected level of attainment;
- how the results are used, documented and maintained.

Assessment Tool	Frequency of Assessment	Expected Level of Attainment
Skills Assessment	Each offering of a required course	70% of students pass each skill (of those students receiving a C or better for course grade)
Alumni Survey	6 years	NA
Employer Survey	periodically	NA
Survey of Graduating Seniors	1 per student	NA
Exit Interview of Graduating Seniors	1 per student	NA
Internship Employer Feedback	At the end of each student internship	NA
Internship Student Feedback	At the end of each student internship	NA

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Assessment Tool	Usage of Results	Documentation and Maintenance
Skills Assessment	Course-by-course skills data are used to produce three kinds of summary reports: - Skills Assessment by Course, - Skills Assessment by Outcome, - Skills Assessment Averages per Objective	- Raw data (skills data per course offering) collected by course instructor. - Summary skills data per course per semester collected and formatted for input to the database. - Summary reports generated from database. - Raw data, reports, and database stored on panther file server.
Alumni Survey	Feedback on: -Program Educational Objectives -Student Outcomes -Curriculum Topics and Technologies	- Administered on surveymonkey. - Reports generated via surveymonkey. - Reports stored on panther file server.
Employer Survey	Feedback on: -Program Educational Objectives -Student Outcomes -Curriculum Topics and Technologies -Alumni Abilities	
Survey of Graduating Seniors	Feedback on: -Program Educational Objectives -Self-rating on Student Outcomes -Perceived contribution of specific courses to Student Outcomes	
Exit Interview of Graduating Seniors	Faculty discussions of curriculum, course content and teaching techniques.	- Administered by Department Chair. - Each semester, anonymous responses are collected in a Word document and stored on panther file server.
Internship Employer Feedback	Feedback on: -Perceived importance of skills and technologies for internship -Rating of student on skills needed for internship -Program Education Objectives -Student Outcomes -Topics and technologies important in a CS curriculum	Surveymonkey is not used due to FERPA considerations. - Paper or electronic document filled out by respondent. - Results collated by hand.
Internship Student Feedback	Feedback on: -Technologies important for internship -Perceived skill before/after internship -Perceived importance of courses for internship preparation	