

William Paterson University
College of Science and Health - Department of Computer Science

Fall 2018 – Spring 2019 Assessment Cycle
Review and Revision of the CS Program Student Outcomes

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Approved by the Department Curriculum Committee on:

Report

Student Outcome S1: Communicate effectively in a variety of professional contexts.

A. Reviews from the CCAR Analyzes of Related Courses

1. From the analysis of the CCAR Data of CS3410

In this course students complete a digital circuit project that includes its design, implementation and simulation in a team of two students. They also produce a report of their project and also make an oral presentation. The report is evaluated by the instructor of the course based on its style and presentation whereas the presentation is evaluated by the whole class, including the instructor. This student outcome is therefore OK for this course.

2. From the analysis of the CCAR Data of CS3450

In this course, each student is required to produce a report on one or more of the following topics: virtualization and the cloud, security, multiple processor systems, LINUX, Android, Window 8, and operating system design. They are encouraged to work in groups of two or three. But some students choose to work by themselves. Although we do not always have the time for the presentations at the end of the semester, we feel that this student outcome is appropriate for this course because of the reports produced by the students. These reports are graded by the instructor of the course.

3. From the analysis of the CCAR Data of CS3500

This course requires having a team project which the teams need to produce documentations covering the software development life cycle. The instructor usually splits the documentation according to the different stages of requirements, specification, design, and implementation. The students need to present their software design to the class. The presentation is graded and many questions on tests and final exam are also used to assess students' knowledge of the project. This student outcome is appropriate and is assessed well.

4. From the analysis of the CCAR Data of CS4800

In this class, students are required to produce a report and to make an oral presentation on a topic related to the legal issues for computing professionals and on the impact of computing technology in society. The reports are graded by the instructor of the course, and the presentations are graded by the instructor and the students in the class. Students are also required to complete a team-project on a topic of current interest in computer science or new development in computing technologies. They must also produce a written report of their project and also make an oral presentation. This student outcome is therefore appropriate and is also well assessed in the course.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objective 05.

C. Revision

N/A

Student Outcome S2:

Demonstrate abilities to apply knowledge of mathematics to the discipline of computer science.

A. Reviews from the CCAR Analyzes of Related Courses

1. From the analysis of the CCAR Data of CS2600

CS2600 is a discrete math course in which we discuss topics that include elementary propositional and predicate logics; elementary set theory; relations and their properties; functions; congruence and Euclidean algorithm; combinatorics; mathematical reasoning; matrices; elements of graph theory; trees and their applications; and Boolean algebra. Two of its major objectives are to emphasize mathematical reasoning and to show the applications of discrete mathematics. Extensive hands-on exercises are also used to assess students' understanding of these concepts.

2. From the analysis of the CCAR Data of CS2800

In addition to discussing number systems (binary, hexadecimal, and octal number systems), the conversions among those number systems and the basic arithmetic operations on those number systems, we also discuss signed decimal arithmetic and two's complement arithmetic. Hands-on exercises are used to help students understand these concepts and many quizzes are used to test their understanding of these concepts.

3. From the analysis of the CCAR Analysis of CS3410

The principles of Boolean algebra are applied to switches, providing mathematical tools for the analysis and synthesis of switching systems.

4. From the analysis of the CCAR Data of CS3420

The following fundamental concepts of discrete mathematics are applied in the context of data structures and algorithms: arithmetic and geometric summations; Logarithms and exponents, polynomial functions, recurrence relations, and asymptotic notations.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objectives 01, 03, 04.

C. Revision

N/A

Student Outcome S3:

Apply computer science theory and software development fundamentals to produce computing-based solutions.

A. Reviews from the CCAR Analyses of Related Courses

1. From the analysis of the CCAR data of CS3420

Procedural abstraction, structured programming and object oriented programming paradigms are applied in the developments of lab assignments.

2. From the analysis of the CCAR data of CS3820

In this course, students implement the language recognition functions of the tokens of a simple programming language given their specifications using regular expressions. They also implement a recursive descent parser of a simple programming language based on the CFG specifications of the syntactic structures of the language. Structure programming paradigm is also expected to be used in all programming assignments. This student outcome can therefore be assessed in this course.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objectives 01, 02, 03, 04, 08.

C. Revision

N/A

Student Outcome S4:

Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.

A. Reviews from the CCAR Analyzes of Related Courses**1. From the analysis of the CCAR data of CS3410**

In this course students complete a digital circuit project that includes its design, implementation and simulation in a team of two students. They also produce a report of their project and also make an oral presentation. The report is evaluated by the instructor of the course based on its style and presentation whereas the presentation is evaluated by the whole class, including the instructor. One criterion in the evaluation of students' work is how well they work together on the project.

2. From the analysis of the CCAR data of CS3500

A major objective of this course is to produce a group project. The instructor usually divides the class into several 3- to 4-person teams (dependent on enrollment). Each team needs to produce documentations which require substantial coordination among team members. Students need to meet outside class time to work on the project. Tests and final exam include questions of team organization and management. This student outcome is appropriate for this course and is assessed sufficiently well.

3. From the analysis of the CCAR data of CS4800

One major objective of this course is for students to complete a team-project on a topic of current interest in computer science or new development in computing technologies. They must also produce a written report of their project and also make an oral presentation. How well students work in a group is a major criteria in the evaluation of their project. This program's student is therefore well suited for this course and is also well assessed here.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objectives 01, 02.

C. Revision

N/A

Student Outcome S5: Demonstrate abilities to locate and make effective use of information.

A. Reviews from the CCAR Analyzes of Related Courses

1. From the analysis of the CCAR data of CS3450

In this course, each student is required to produce a report on one or more of the following topics: virtualization and the cloud, security, multiple processor systems, LINUX, Android, Window 8, and operating system design. Students are encouraged to work in groups of two or three. But some students choose to work by themselves.

2. From the analysis of the CCAR data of CS3820

In this course, students are required to learn a new programming language and to produce a report based on a template provided by the instructor. They are also required to write program assignments in their chosen programming language. We then assess how substantial are their reports and the quality of their programming projects. This project necessitates a lot of research over the web and we believe that it allows us to assess the abilities of the students to locate and make effective use of information. We therefore feel that this learning outcome is appropriate and is assessed appropriately.

3. From the analysis of the CCAR data of CS4800

One major objective of this course is for students to complete a team-project on a topic of current interest in computer science or new development in computing technologies. They must also produce a written report of their project and also make an oral presentation. The evaluation of project reports and the oral presentations takes into consideration the quality of the reports and the efforts that students put into their research work. In fact, as part of this course, a librarian gives a lecture on how to use the library resources properly.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objectives 01, 02, 03.

C. Revision

No revision is needed.

Student Outcome S6:

Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

A. Reviews from the CCAR Analyzes of Related Courses**1. From the analysis of the CCAR data of CS3410**

In this course students are expected to complete a digital circuit project that includes its design, implementation and simulation in a team of two students. This project is used to assess this student outcome.

2. From the analysis of the CCAR data of CS3420

One major objective of this course is to introduce students to the different data structures that are often used to solve computer problems and the algorithms used to manipulate those data structures. Questions on tests and the final exam are used to assess students' knowledge of these data structures and their ability to understand and use the algorithms. Students most also write programs that demonstrate their understanding of the data structures and the algorithms that are used to manipulate them. This student outcome is therefore appropriate and well assessed.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objectives 01, 03, 07, 08..

C. Revision

N/A

Student Outcome S7:

Demonstrate an understanding of the major programming domains and the knowledge of the most appropriate programming language for each domain.

A. Reviews from the CCAR Analyzes of Related Courses

1. From CCAR Analysis of CS3820

A major objective of this course is to introduce the major programming domains and the most appropriate programming language for each domain. A substantial amount of exercises and questions on tests and the final exam are also used to assess students understanding and knowledge of these concepts. We therefore believe that this student outcome is appropriate and is assessed sufficiently well.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objectives 01, 03, 07.

C. Revision

No revision

Student Outcome S8:

Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

A. Reviews from the CCAR Analyzes of Related Courses

1. From the analysis of the CCAR data of CS3500

One of the major objectives of this course is for the students to produce a team project. The students need to use software engineering principles to analyze and design large software projects. The results of the analysis and the design are documented and assessed. Substantial amount of class exercises, tests and final exam questions are used to assess students' knowledge of these software engineering principles. This student outcome is appropriate for this software engineering course and the evaluation of the outcome is well assessed.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objectives 01, 03, 07, 08.

C. Revision

N/A

Student Outcome S9:

Recognize professional responsibilities and make informed judgements in computing practice based on legal and ethical principles.

A. Reviews from the CCAR Analyzes of Related Courses

1. From the analysis of the CCAR data of CS4800

In this class, we introduce the ethical and legal issues for computing professionals and the impact of computing technology in society. Students are also required to produce a report and to make a presentation on a topic related to the ethical issues for computing professionals and on the impact of computing technology in society. The reports are graded by the instructor of the course, and the presentations are graded by the instructor and the students in the class. This student outcome is therefore appropriate and is also well assessed in the course.

B. Review of Consistency with the Program Educational Objectives

Related to the program educational objectives 03, 06.

C. Revision

N/A

Table of Revised CS Program Student Outcomes

Starting with the Fall 2019 semester, the following will be the new CS program's student outcomes:

Program's Students Outcomes	Assessed in the following courses:
S1 Communicate effectively in a variety of professional contexts.	CS 3410, CS 3450, CS 3500, CS4800
S2 Demonstrate abilities to apply knowledge of mathematics to the discipline of computer science.	CS 2600, CS 2800, CS3410, CS3420
S3 Apply computer science theory and software development fundamentals to produce computing-based solutions.	CS 3410, CS3820
S4 Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	CS 3410, CS 3500, CS4800
S5 Demonstrate abilities to locate and make effective use of information.	CS 3450, CS 3820, CS 4800
S6 Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	CS3410, CS 3420
S7 Demonstrate an understanding of the major programming domains and the knowledge of the most appropriate programming language for each domain.	CS 3820
S8 Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	CS 3500
S9 Recognize professional responsibilities and make informed judgements in computing practice based on legal and ethical principles.	CS 4800

Relationship Between the Program Educational Objective and the Program's Student Outcomes

Program Educational Objectives	Program's Student Outcomes
01. To create an environment conducive to learning through teaching, research and creative activities.	S2, S3, S4, S5, S6, S7, S8
02. To promote student success, academic excellence, and community outreach with opportunities for lifelong learning.	S3, S4, S5
03. To actively challenge students to high levels of intellectual and professional accomplishment and personal growth in preparation for careers and advanced studies in computing, and productive citizenship.	S2, S3, S5, S6, S7, S8, S9
04. To provide students with a sound foundation in mathematics, science, computer science, and the application of this knowledge, which will equip them either to enter careers or pursue advanced studies in computing	S2, S3
05. To develop students' ability to communicate well, both orally and in writing.	S1
06. To develop students' understanding of the ethical and moral issues for computing professionals and the impact of computing technology in society.	S9
07. To develop a curriculum with core materials that provide our graduates with the fundamental knowledge of algorithms, data structures, software design, concepts of programming languages, computer organization, and computer networks and security, and advanced course work that provides them with breadth of knowledge, and also builds on the core materials to provide them with some depth of knowledge.	S6, S7, S8
08. To emphasize problem analysis and solution design throughout the program.	S3, S6, S8