

Weber State University
Annual Assessment of Evidence of Learning

Cover Page

Department/Program: **Computer Science**

Academic Year of Report: **2016/17** (Summer 2016, Fall 2016, Spring 2017)

Date Submitted: **11/15/17**

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A. Brief Introductory Statement:

Please review the Introductory Statement and contact information for your department or academic program displayed on the assessment site: <http://www.weber.edu/portfolio/departments.html> - if this information is current, please place an 'X' below. No further information is needed. We will indicate "Last Reviewed: [current date]" on the page.

Information is current; no changes required.

Information is not current; updates below.

Update:

B. Mission Statement

Please review the Mission Statement for your department or academic program displayed on the assessment site:

<http://www.weber.edu/portfolio/departments.html> - if it is current, please indicate as much; we will mark the web page as “Last Reviewed [current date]”. No further information is needed.

If the information is not current, please provide an update:

Information is current; no changes required.

Information is not current; updates below.

Update:

C. Student Learning Outcomes

Please review the Student Learning Outcomes for your academic program displayed on the assessment site:

<http://www.weber.edu/portfolio/departments.html> - if they are current, please indicate as much; we will mark the web page as “Last Reviewed [current date]”. No further information is needed.

If they are not current, please provide an update:

Information is current; no changes required.

Information is not current; updates below.

Updated Measurable Learning Outcomes

At the end of their study at WSU, students in this program will:

- 1) ...
- 2) ...
- 3) ...
- 4) ...
- 5) ...
- 6) etc.

D. Curriculum

Please review the Curriculum Grid for your department or academic program displayed on the assessment site:

<http://www.weber.edu/portfolio/departments.html> - if it is current, please indicate as much; we will mark the web page as “Last Reviewed: [current data]”. No further information is needed.

If the curriculum grid is not current, please provide an update:

Information is current; no changes required.

Information is not current; updates below

Our curriculum map has been updated:

Curriculum Map

Curriculum Map: Core Courses Articulated with Student Learning Outcomes

	Student Outcomes										
	(a) Apply knowledge of computing and mathematics	(b) Analyze problems, identify and define requirements	(c) Design, implement, & evaluate computer-based systems	(d) Function in teams	(e) Professional, ethical, security, and social behavior	(f) Communicate effectively	(g) Analyze local and global impact of computing	(h) Engage in continuing professional development	(i) Use current techniques, skills, and tools	(j) Apply mathematics, algorithms, & computer theory	(k) Apply design and development principles
I = Introduced R = Reinforced E = Emphasized ¹											
Core Program Courses ²											
CS 1030 Foundations of Computer Science	I	I			I		I				
CS 1400 Fundamentals of Programming	R	R	I		R		R				
CS 1410 Object-Oriented Programming	R	R	R		R		R	I	I	I	
CS 2130 Computational Structures	R	R	R		R		R			R	
CS 2350 Web Development			R		R		R	R	R		
CS 2420 Introduction to Data Structures & Algorithms	R	R	R		R		R				
CS 2450 Software Engineering I	R	R	R	I	R	I	R	R	R		I
CS 2550 Database Design & Application Development			R		R		R	R	R		
CS 2705 Network Fundamentals and Design	R	R	R		R		R	R	R	R	R

		Student Outcomes									
		(a) Apply knowledge of computing and mathematics	(b) Analyze problems, identify and define requirements	(c) Design, implement, & evaluate computer-based systems	(d) Function in teams	(e) Professional, ethical, security, and social behavior	(f) Communicate effectively	(g) Analyze local and global impact of computing	(h) Engage in continuing professional development	(i) Use current techniques, skills, and tools	(j) Apply mathematics, algorithms, & computer theory
I = Introduced R = Reinforced E = Emphasized ¹											
Core Program Courses ²											
CS 2810 Computer Architecture/Organization			R	R		R		R	R	R	
CS 3100 Operating Systems		R	R	R		R	R	R	R	R	R
CS 3230 Internet Multimedia and Applications Using Java		R	R	R				R	R	R	
CS 3280 Object Oriented Windows Application Development w/ C#		R	R	R				R	R	R	
CS 3550 Advanced Database Programming		R	R	R				R	R	R	R
CS 3750 Software Engineering II			E	E	R	E	E	R	R		E
CS 4110 Concepts of Formal Languages and Algorithms		E	E	E						E	
Capstone	CS 4230 Java Application Development	E	E	E	E	E	E	E	E	E	E
	CS 4350 Advanced Internet Programming	E	E	E	E	E	E	E	E	E	E
	CS 4650 Advanced Game Development	E	E	E	E	E	E	E	E	E	E
	CS 4450 Advanced Software Engineering	E	E	E	E	E	E	E	E	E	E
	CS 4790 N-Tier Web Programming	E	E	E	E	E	E	E	E	E	E

¹ Program improvement statistics are collected for these courses

² Less detailed evaluation data are collected from introducing and reinforcing courses

³ Students must select one course

E. Assessment Plan

Please review the Assessment Plan for your department displayed on the assessment site: <http://www.weber.edu/portfolio/departments.html> - if the plan is current, please indicate as much; we will mark the web page as “Last Reviewed [current date]”. No further information is needed.

The site should contain an up-to-date assessment plan with planning going out a *minimum of three years* beyond the current year. Please review the plan displayed for your department at the above site. The plan should include a list of courses from which data will be gathered and the schedule, as well as an overview of the assessment strategy the department is using (for example, portfolios, or a combination of Chi assessment data and student survey information, or industry certification exams, etc.).

Please be sure to include your planned assessment of any general education courses taught within your department. This information will be used to update the General Education Improvement and Assessment Committee’s planning documentation.

Assessment plan:

The current chart needs to be updated to reflect future years and some course changes. Please replace the current chart with the revision below. All the wording after the chart should be retained.

Program-Level Assessment Data Collection, Analysis, and Improvement Schedule

Course	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
CS1030 Foundations of Computer Science		CA/RI	Imp		
CS2130 Computational Structures		CA/RI	Imp		
CS3230 Object Oriented User Interface Development with Java		CA/RI	Imp		
CS4110 Concepts of Formal Languages and Algorithms for Comp.		CA/RI	Imp		
CS1400 Fundamentals of Programming			CA/RI	Imp	
CS2550 Database Design & Application Development			CA/RI	Imp	
CS2705 Network Fundamentals and Design			CA/RI	Imp	
CS3030 Scripting Languages			CA/RI	Imp	
CS1410 Object-Oriented Programming				CA/RI	Imp
CS2450 Software Engineering I				CA/RI	Imp
CS3100 Operating Systems				CA/RI	Imp
CS4450 Advanced Software Engineering Methods				CA/RI	Imp

CS2350 Web Development	Imp				CA/RI
CS2420 Introduction to Data Structures and Algorithms	Imp				CA/RI
CS3550 Advanced Database Programming	Imp				CA/RI
CS4230 Java Application Development	Imp				CA/RI
CS2810 Computer Architecture/Organization	CA/RI	Imp			
CS3750 Software Engineering II	CA/RI	Imp			
CS3280 Object-Oriented Windows Application Development	CA/RI	Imp			
CS4790 N-Tier Web Programming	CA/RI	Imp			

CA/RI – Course Assessment and Recommended Improvements (to be approved by CS Faculty and CS Industry Advisory Council)

Imp – Implement Improvements

The following three steps outline the Computer Science assessment process:

1. Following the above schedule, course assessment subcommittees will convene during the assigned year to review the effectiveness of course delivery in achieving department objectives and to establish a Course Assessment Plan. The Plan includes summary evidence of how the course currently satisfies the department’s student learning outcomes, investigating specific assessment instruments, the associated learning outcomes, and resulting class performance. Evidence of learning for a specific student learning outcome is deemed successful if the associated assessment measure is 80% or above.

In addition, the source assessment subcommittees will list recommendations for course improvement to address any deficiencies in meeting applicable student learning outcomes.

2. Program recommendations will be compiled by Spring semester and submitted for approval by both CS Faculty and CS Industry Advisory Council, effectively closing the loop and thus engaging department action toward addressing deficiencies in achieving student learning outcomes.
3. Recommendations for improvement will be implemented during the subsequent year indicated in the schedule above. An evaluation of the implementation of course improvements will indicate if the course should be reassessed immediately or if the regular course assessment cycle may be resumed.

Assessment for the Creative Arts (CA) General Education class **CS1010 – Introduction to Interactive Entertainment** occurs bi-annually following the rubric and metrics provided by the Creative Arts subcommittee of the General Education Improvement & Assessment Faculty Senate Standing Committee.

F. Report of assessment results for the most previous academic year:

There are a variety of ways in which departments can choose to show evidence of learning. This is one example. The critical pieces to include are 1) what learning outcome is being assessed, 2) what method of measurement was used, 3) what the threshold for 'acceptable performance' is for that measurement, 4) what the actual results of the assessment were, 5) how those findings are interpreted, and 6) what is the course of action to be taken based upon the interpretation.

A. Evidence of Learning: Courses within the Major

(this is a sample page for purpose of illustration only; a blank template can be found on the next page)

The completed Implementation Evaluations and Course Assessment Plans for courses evaluated during 2016-17 are included in the .pdf attachment sent with this report.

b. Evidence of Learning: High Impact Practices (HIPs)

List the activities you have within your academic program that you consider to be high impact. For key elements of high impact practices, see: [Key Elements of High-Impact Practices](#).

If you cannot identify any HIPs occurring within your academic program, please indicate that. Are you planning to incorporate HIPs in the near future?

No community-engaged learning (CEL) or independent study courses were assessed for this current report. The department is strongly considering adding high-impact practices in the future.

c. Evidence of Learning: General Education Courses

CS1010: Fall 2016

Evidence of Learning: General Education Courses					
Creative Arts					
Measurable Learning Outcome	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
Students will...	Direct and Indirect Measures*				
Create works of art and/or increase their understanding of creative processes in writing, visual arts, interactive entertainment, or performing arts.	Creative Assignments: <u>Group:</u> Project - High Concept Document	85% of students will earn a C or higher on final projects	77 of 77 (100%) students earned a C or higher.	Students are performing nominally for evidence of student learning.	No action required at this time.
	Quizzes, Exams, Papers: <u>Individual:</u> Design Practice: <i>Games/Video Games</i> <i>Designing & Developing Games</i> <i>Major Genres</i> <i>Game Concepts</i> <i>Creative and Expressive Play</i> <i>Storytelling</i>	85% of students will earn a C or higher on their final projects	52 of 77 (68%) students earned a C or higher.	Findings fall short of the threshold objective. The subgroup of students who did not reach the stated threshold either did not submit several of the game review assignments or submitted them late. The omitted assignments earned zero points and significantly impacted the overall collective grade for these assignments.	The subgroup of students who submitted each of the 13 design practice assignments easily passed the designated threshold. Therefore, emphasis needs to be placed on the cumulative effect of missed assignments on the final grade.

Evidence of Learning: General Education Courses					
Creative Arts					
Measurable Learning Outcome	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
Students will...	Direct and Indirect Measures*				
Demonstrate knowledge of key themes, concepts, issues, terminology and ethical standards employed in creative arts disciplines. They will use this knowledge to analyze works of art from various traditions, time periods, and cultures.	Demonstrate Knowledge: Quizzes, Exams, Papers: <u>Individual:</u> Game Review: Action Games Arcade Games Adventure Games Simulation Games Puzzle Games Role-Playing Games	85% of students will earn a C or higher on final projects	66 of 77 (86%) students earned a C or higher.	Students are performing nominally for evidence of student learning.	No action required at this time.
	Group presentations: Final Project Submission	85% of students will earn a C or higher on their final projects	68 of 77 (88%) students earned a C or higher.	Students are performing nominally for evidence of student learning.	No action required at this time.

*At least one measure per objective must be a direct measure.

CS1010: Spring 2017

Evidence of Learning: General Education Courses					
Creative Arts					
Measurable Learning Outcome	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
Students will...	Direct and Indirect Measures*				
Create works of art and/or increase their understanding of creative processes in writing, visual arts, interactive entertainment, or performing arts.	Creative Assignments: <u>Group:</u> Project – High Concept Document	85% of students will earn a C or higher on final projects	69 of 70 (99%) students earned a C or higher.	Students are performing nominally for evidence of student learning.	No action required at this time.
	Quizzes, Exams, Papers: <u>Individual:</u> Design Practice: <i>Games/Video Games</i> <i>Designing & Developing Games</i> <i>Major Genres</i> <i>Game Concepts</i> <i>Creative and Expressive Play</i> <i>Storytelling</i>	85% of students will earn a C or higher on their final projects	51 of 70 (73%) students earned a C or higher.	The scores are improved from the Fall 2016 Assessment (68% to 73%), but many of the student design practice submissions are still either absent or late, which significantly impacts the overall collective grade for these assignments.	The subgroup of students who submitted each of the 13 design practice assignments easily passed the designated threshold. Therefore, emphasis needs to be placed on the cumulative effect of missed assignments on the final grade.
Demonstrate knowledge of key themes, concepts, issues, terminology and ethical standards employed in creative arts disciplines. They will use this knowledge to analyze works of art from various traditions, time periods, and cultures.	Demonstrate Knowledge: Quizzes, Exams, Papers: <u>Individual:</u> Game Review: <i>Action Games</i> <i>Arcade Games</i> <i>Adventure Games</i> <i>Simulation Games</i> <i>Puzzle Games</i> <i>Role-Playing Games</i>	85% of students will earn a C or higher on final projects	67 of 70 (96%) students earned a C or higher.	Students are performing nominally for evidence of student learning.	No action required at this time.

Evidence of Learning: General Education Courses					
Creative Arts					
Measurable Learning Outcome	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
Students will...	Direct and Indirect Measures*				
	Group presentations: Final Project Submission	85% of students will earn a C or higher on their final projects	50 of 70 (71%) students earned a C or higher.	Findings fall short of the threshold objective. A sub-set of students either did not submit or submitted late the Final Project. Any missing design practice assignments also have an effect on the Final Project as the work is cumulative.	Greater emphasis needs to be placed on the Final Project starting at the beginning of the semester. Students need to be made aware of how the individual assignments will contribute to their work on the Final Project.

*At least one measure per objective must be a direct measure.

G. Summary of Artifact Collection Procedure

Summary Information (as needed)

All artifact results are stored electronically on Canvas and/or Chi-tester. The Sources for Assessment Data for **Courses within the Major** are listed in the Course Assessment Devices and Class Performance section of the Course Assessment Plans and Implementation Evaluations listed in Section F. a above. The Sources for Assessment Data for **CS1010** are listed in the Direct and Indirect Measures column in the charts located in Section F.c above.

Appendix B

Please provide the following information about the full-time and adjunct faculty contracted by your department during the last academic year (summer through spring). Gathering this information each year will help with the headcount reporting that must be done for the final Five Year Program Review document that is shared with the State Board of Regents.

Faculty 2016-17	
Headcount	33
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	9
Full-time Tenured	3
Full-time Non-Tenured (includes tenure-track)	6
Part-time and adjunct	0
With Master's Degrees	12
Full-time Tenured	2
Full-time Non-Tenured	4
Part-time and adjunct	6
With Bachelor's Degrees	12
Full-time Tenured	0
Full-time Non-tenured	2
Part-time and adjunct	10
Other	0
Full-time Tenured	0
Full-time Non-tenured	0
Part-time	0
Total Headcount Faculty	33
Full-time Tenured	5
Full-time Non-tenured	12
Part-time	16

Please respond to the following questions.

- 1) Based on your program's assessment findings, what subsequent action will your program take?

The most recent ABET evaluation of the CS BS program has inclined our future assessment efforts more heavily toward students who have either completed (just prior to graduation) or nearly completed (enrolled in capstone classes) the curriculum. In response, at least one capstone class will be assessed in each year of the five-year course review cycle. We are also requiring a separate Bachelor's Degree Assessment course (CS4899) in which all BS graduates will demonstrate skillsets appropriate to the discipline.

- 2) We are interested in better understanding how departments/programs assess their graduating seniors or graduate students. Please provide a short narrative describing the practices/curriculum in place for your department/program. Please include both direct and indirect measures employed. Finally, what were your findings from this past year's graduates?

As mentioned above, the Computer Science curriculum includes the course CS4899 – Bachelor's Degree Assessment. The purpose of this zero-credit hour class is to prepare and assess students about to graduate from the program. The course will typically be taken by seniors during their last semester and has four requirements/objectives:

- a. **Summative assessment exam of student knowledge and skillsets obtained from upper division courses.**
 - b. **Exit interview session that both simulates a standard job interview and gathers student feedback about their overall experiences with the program's faculty and curriculum, including recommendations for program improvement.**
 - c. **Development of student portfolio in preparation for job interviews and career advancement.**
 - d. **Student attendance to relevant campus presentations from outside speakers invited to the university.**
- 3) **Results from the assessment exam will provide insights on student readiness and also promote analysis of how course content is delivered in order to improve future student performance.**