2017 - 2018
Annual Program Assessment Report

The Office of Academic Program Assessment
California State University, Sacramento

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or **contact us** for more help.

Please begin by selecting your program name in the drop down.
If the program name is not listed, please enter it below:

BS Computer Science

OR enter program name:

Section 1: Report All of the Program Learning Outcomes Assessed

Question 1: Program Learning Outcomes

Q1.1.
Which of the following Program Learning Outcomes (PLOs), Sac State Baccalaureate Learning Goals (BLGs), and emboldened Graduate Learning Goals (GLGs) **did you assess?** [**Check all that apply**]

- ☐ 1. **Critical Thinking**
- ☐ 2. **Information Literacy**
- ☑ 3. **Written Communication**
- ☐ 4. **Oral Communication**
- ☐ 5. Quantitative Literacy
- ☐ 6. **Inquiry and Analysis**
- ☐ 7. Creative Thinking
- ☐ 8. Reading
- ☐ 9. Team Work
- ☐ 10. Problem Solving
- ☐ 11. Civic Knowledge and Engagement
- ☐ 12. **Intercultural Knowledge, Competency, and Perspectives**
- ☑ 13. Ethical Reasoning
- ☐ 14. Foundations and Skills for Lifelong Learning
- ☐ 15. **Global Learning and Perspectives**
- ☐ 16. Integrative and Applied Learning
- ☐ 17. Overall Competencies for GE Knowledge
- ☐ 18. **Overall Disciplinary Knowledge**
- ☐ 19. **Professionalism**
- ☐ 20A. Other, specify any assessed PLOs not included above:

a. _____

b. _____

c. _____

- ☐ 20B. **Check here if your program has not collected any data for any PLOs**. Please go directly to Q6 (skip Q1.2 to Q5.3.1.)

Q1.2.
Please provide more detailed background information about **EACH PLO** you checked above and other information including how your specific PLOs are **explicitly** linked to the Sac State **BLGs/GLGs**:

Computer science student learning outcomes or PLOs are abilities a B.S. Computer Science graduate should possess at the time of graduation. The selection of our eight PLOs is guided by the Computing Accreditation Commission (CAC) of ABET, Inc., the accrediting body for computer science programs.

Our PLOs are listed below. At graduation, a B.S. Computer Science student should be able to:

(a) Apply fundamental knowledge of mathematics, algorithmic principles, computer theory, and principles of computing systems in the modeling and design of computer-based systems that demonstrate an understanding of tradeoffs involved in design choices.

(b) Analyze a problem, specify the requirements, design, implement, and evaluate a computer-based system, process, component, or program that satisfies the requirements.

(c) Apply design and development principles in the construction of software systems of varying complexity.

(d) Use current skills, techniques, and tools necessary for computing practice.

(e) Function effectively as a member of a team to accomplish a common goal.

(f) Understand professional, ethical, legal, social, and security issues and responsibilities; analyze the impact of computing on individuals, organizations, and society both locally and globally.

(g) Write effectively.

(h) Give effective oral presentations

For each PLO, the faculty identified a set of measurable performance criteria or indicators in upper division core courses. Assignments, exam questions, surveys, rubrics, etc. were developed to evaluate these performance criteria. Outcomes (a) through (d) address the theoretical concepts, technical knowledge, and skills necessary for our B.S. graduates to be successful upon graduation. Outcomes (e) through (h) address nontechnical characteristics or abilities the Department expects graduates to have, i.e., effective oral and written communication skills, teamwork, and ethical, legal responsibilities.

In 2015-2016, the Department assessed PLOs (a) through (d). In 2016-2017, the Department assessed PLO (e) Team work and PLO (h) Oral presentation. In 2017-2018, we assess PLOs (f) and (g) to complete our three-year assessment cycle.

Our three-year assessment cycle for eight PLOs is as follows:

Year	Outcomes Assessed (Abbreviated Form)	Courses
Year 1 (2015-2016)	(a) Application of fundamental knowledge	CSC 130, 133, 134, 135, 137, 138, and 139
	(b) Computer system development cycle	CSC 131, 137, 138, 139, and 190/191
	(c) Application of software development principles	CSC 131, 133, 138, and 190/191

	(d) Application of skills, techniques, and tools for computing practice	CSC 133, 134, 135, 137, 139, and 195/195A
Year 2 (2016-2017)	(e) Team work	CSC 131, 190/ 191, and 195/195A
	(h) Oral Communication	CSC 131, 190/191, and 195/195A
Year 3 (2017-2018)	(f) Professional, ethical, and security issues and responsibilities	CSC 138, 190/191, and 195/195A; PHIL 103
	(g) Written communication	CSC 190/191 and 195/195A

The PLOs that have been assessed this year (f and g) and their performance criteria are as follows.

(f) Understand professional, ethical, legal, social, and security issues and responsibilities; analyze the impact of computing on individuals, organizations, and society both locally and globally.

f-1.   Know, understand, and practice professional codes of conduct (*i.e., ACM Code of Ethics and Professional Conduct, IEEE Code of Ethics, ACM/IEEE Software Engineering Code of Ethics and Professional Practice.)
f-2   Understand need for and use of proper security features.
f-3.   Be able to evaluate the ethical dimensions of a computer solution to a problem.
f-4.   Understand moral and ethical dimensions of a computer solution to a problem.

(g) Write effectively.

The performance criteria for PLO (g) as well as the rubric was recently reviewed, updated, and approved at the Department Meeting on 4/13/2018 to make sure they were closely aligned to the PLO and clearly specify student perforamnce for each criterion, based on the feedback for the 2016-2017 annual assessment report we received from OAPA.

The updated performance criteria for PLO (g) are as follows:

g-1.   Focus – clearly addresses the topics
g-2.   Organization – introduction includes clear purpose and overview of document; body provides supportive information; conclusion is reasonable and well-stated.
g-3   Problem Statement - purpose, nature of challenges, and significance of work are clear.
g-4   Word Choice – use and placement of words and phrases are appropriate and accurate for the topics addressed.
g-5   Sentence and Paragraph Structure – well-constructed sentences with varied structures; correct syntax, grammar, and spelling.

The updated rubric for each updated performance criteria for PLO (g) are as follows (where 3 is the target for each criterion):

Criterion	4	3	2	1
Focus	All topics are addressed clearly and completely.	Most topics are addressed clearly and completely.	Most topics are addressed but not clearly and/or completely.	Not all topics are addressed.
Organization	The introduction states the purpose for writing and an overview of the content of writing. The body provides supportive information that is relevant and presented in a logical order. The conclusion is strong.	The introduction includes an overview of writing but not a clear description of the purpose of writing. The body provides supportive information that is limited but relevant to the topics and is presented in a logical order. The conclusion is reasonable but not strong.	The introduction does not provide a complete overview of writing and the description of the purpose of writing is not clear. The body provides a limited amount of supportive information that is relevant and is not presented in a logical order. There is a conclusion but not well stated.	There is no clear introduction, structure, or conclusion.
Purpose	The author's purpose of writing is very clear, and there is strong evidence of attention to the reader. The author's extensive knowledge and/or experience with the topics is evident.	The author's purpose of writing is somewhat clear, and there is some evidence of attention to reader. The author's knowledge and/or experience with the topics is evident.	The author's purpose of writing is somewhat clear, and there is some evidence of attention to reader. The author's knowledge and/or experience with the topics seem limited.	The author's purpose of writing is unclear and appears to have little knowledge relevant to the requested topics.
Word Choice	The author's choice, use and placement of words and phrases are appropriate for the topics addressed and accurate, natural, and not forced.	The author's choice, use, and placement of words and phrases are generally appropriate and accurate.	The author's choice, use and placement of words and phrases are too often inappropriate and/or inaccurate.	The author's choice, use and placement of words and phrases does not articulate intended meaning.
Sentence Structure, Grammar, Mechanics, & Spelling	All sentences are well constructed and have varied structure and length. The author makes no errors in grammar, mechanics, and/or spelling.	Most sentences are well constructed and have varied structure and length. The author makes a few errors in grammar, mechanics, and/or spelling, but they do not interfere with understanding.	Most sentences are well constructed, but they have a similar structure and/or length. The author makes several errors in grammar, mechanics, and/or spelling that interfere with understanding.	Sentences sound awkward, are distractingly repetitive, or are difficult to understand. The author makes numerous errors in grammar, mechanics, and/or spelling that interfere with understanding.

In this report we are required to select ONE PLO as an example. **We have selected PLO f (Professional, ethical, and security issues and responsibilities)**, and this report will focus on this PLO. However, our assessmenet data for the other PLO that we have assessed this year (PLO g Write effectively) may be provided upon request.

The table below shows how our specific PLOs are explicitly linked to the Sac State BLGs.

University Baccalaureate Learning Goals	(a) Fundamental Knowledge	(b) Analysis	(c) Design	(d) Skills	(e) Teamwork	(f) Ethics	(g) Written Communications	(h) Oral Communications
Competence in Discipline	X	X	X	X				
Knowledge of Human Cultures and Physical and Natural Worlds	X				X	X		
Intellectual and Practical Skills	X	X	X	X	X	X	X	X
Personal and Social Responsibilities				X	X	X		
Integrative Learning	X	X	X	X			X	X

Q1.2.1.
Do you have rubrics for your PLOs?
- ○ 1. Yes, for all PLOs
- ◉ 2. Yes, but for some PLOs
- ○ 3. No rubrics for PLOs
- ○ 4. N/A
- ○ 5. Other, specify:

Q1.3.
Are your PLOs closely aligned with the mission of the university?
- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Q1.4.
Is your program externally accredited (other than through WASC Senior College and University Commission (WSCUC))?
- ◉ 1. Yes
- ○ 2. No (skip to **Q1.5**)
- ○ 3. Don't know (skip to **Q1.5**)

Q1.4.1.

If the answer to Q1.4 is **yes**, are your PLOs closely aligned with the mission/goals/outcomes of the accreditation agency?
- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Q1.5.
Did your program use the **Degree Qualification Profile** ("DQP", see http://degreeprofile.org) to develop your PLO(s)?
- ○ 1. Yes
- ◉ 2. No, but I know what the DQP is
- ○ 3. No, I don't know what the DQP is
- ○ 4. Don't know

Q1.6.
Did you use action verbs to make each PLO measurable?
- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

(Remember: Save your progress)

Section 2: Report One Learning Outcome in Detail

Question 2: Standard of Performance for the Selected PLO

Q2.1.
Select **OR** type in **ONE(1)** PLO here as an example to illustrate how you conducted assessment (be sure you *checked the* **correct box** for this PLO in Q1.1):

Ethical Reasoning

If your PLO is **not listed, please enter it here**:

Q2.1.1.
Please provide more background information about the **specific PLO** you've chosen in Q2.1.

As detailed in Q 1.2, we use the following four performance indicators (criteria) to assess PLO (f).

(f) Understand professional, ethical, legal, social, and security issues and responsibilities; analyze the impact of computing on individuals, organizations, and society both locally and globally.

f-1.   Know, understand, and practice professional codes of conduct (*i.e., ACM Code of Ethics and Professional Conduct, IEEE Code of Ethics, ACM/IEEE Software Engineering Code of Ethics and Professional Practice.)
f-2   Understand need for and use of proper security features.
f-3.   Be able to evaluate the ethical dimensions of a computer solution to a problem.
f-4.   Understand moral and ethical dimensions of a computer solution to a problem.

The PLO (f) and its performance indicators are evaluated:

using student papers or questions embedded in quizzes and the final exam in

(1) Phil 103 Business and Computer Ethics, a required course for all computer science majors
(2) CSC 138 Computer Networks and Internets, a required core course for computer science majors

and using surveys completed by supervisors of students in

(3) CSC 195 Field Work in Computer Science. Student performance in internships is assessed by their employers as detailed in Q2.3 and Q3.2.1. Internships provide students with valuable work experience before they complete their B.S degrees.

Q2.2.
Has the program developed or adopted ***explicit program standards of performance/expectations*** for this PLO? (e.g. "We expect 70% of our students to achieve at least a score of 3 or higher in all dimensions of the Written Communication VALUE rubric.")
- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ○ 4. N/A

Q2.3.
Please **1) provide and/or attach the rubric(s) AND 2) the standards of performance/expectations** that you have developed for *the selected PLO* here:

In Phil 103 and CSC 138, we used student questions embedded in quizzes and the final exam. For each performance indicator, the percentage of students meeting or exceeding the standard was computed. The minimum average for an outcome (performance indicator) to be considered satisfied was established at 70%.

To evaluate student performance in their internships (CSC 195), an evaluation form is completed by the employer. Among other criteria, the form asks the employer to rate the student in terms of "Awareness of ethical and societal concerns". The possible ratings are:

Outstanding
Above Average
Average
Below Average
Weak
Did Not Observe

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Q2.4. PLO	Q2.5. Stdrd	Q2.6. Rubric	Please indicate where you have published the **PLO**, the **standard (stdrd)** of performance, and the **rubric** that was used to measure the PLO:
☐	☐	☐	1. In **SOME** course syllabi/assignments in the program that address the PLO
☑	☐	☐	2. In **ALL** course syllabi/assignments in the program that address the PLO
☑	☐	☐	3. In the student handbook/advising handbook
☐	☐	☐	4. In the university catalogue
☑	☐	☐	5. On the academic unit website or in newsletters
☑	☑	☑	6. In the assessment or program review reports, plans, resources, or activities
☑	☐	☐	7. In new course proposal forms in the department/college/university
☑	☐	☐	8. In the department/college/university's strategic plans and other planning documents
☐	☐	☐	9. In the department/college/university's budget plans and other resource allocation documents
☑	☑	☑	10. Other, specify:

			ABET/CAC Self-Study

Question 3: Data Collection Methods and Evaluation of Data Quality for the Selected PLO

Q3.1.

Was assessment data/evidence **collected** for the selected PLO?

- ◉ 1. Yes
- ○ 2. No (skip to **Q6**)
- ○ 3. Don't know (skip to **Q6**)
- ○ 4. N/A (skip to **Q6**)

Q3.1.1.

How many assessment tools/methods/measures **in total** did you use to assess this PLO?

2

Q3.2.

Was the data **scored/evaluated** for this PLO?

- ◉ 1. Yes
- ○ 2. No (skip to **Q6**)
- ○ 3. Don't know (skip to **Q6**)
- ○ 4. N/A (skip to **Q6**)

Q3.2.1.

Please describe how you collected the assessment data for the selected PLO. For example, in what course(s) or by what means were data collected:

As mentioned in Q 2.1.1, the PLO was assessed in three courses: (1) Phil 103 Business and Computer Ethics, (2) CSC 138 Computer Networks and Internets, and (3) CSC 195 Field Work in Computer Science.

The details of the evaluation for each course are as follows.

Phil 103 Business and Computer Ethics. Student performance on five test-embedded questions was assessed in Spring 2018. The evaluation included all the students who were enrolled in a randomly selected section of Phil 103 in Fall 2017. The total number of the students included in the evaluation was 39. The results of this evaluation are shown in Q4.1.

CSC 138 Computer Networks and Internets. Student performance on one test-embedded question was assessed at Spring 2018. The evaluation included all the students who were enrolled in CSC 138 in Spring 2018. The total number of the students included in the evaluation was 33. The results of this evaluation are shown in Q4.1.

CSC 195 (Field Work). A survey (evaluation form) was completed by employers of students who worked as interns in companies or state/federal agencies during their junior or senior year. Internships provide students with valuable work experience before they complete their B.S. degrees. At the completion of an internship, supervisors were asked to rate an intern's performance in a number of different areas, including "Awareness of ethical and societal concerns". The evaluation included all the students who participated in internships in Fall 2017 and Spring 2018 in CSC 195. The total number of the students included in the evaluation was 38. The results are given in Q4.1.

(Remember: Save your progress)

Question 3A: Direct Measures (key assignments, projects, portfolios, etc.)

Q3.3.

Were direct measures (key assignments, projects, portfolios, course work, student tests, etc.) used to assess this PLO?

- ◉ 1. Yes

○ 2. No (skip to **Q3.7**)
○ 3. Don't know (skip to **Q3.7**)

Q3.3.1.
Which of the following direct measures (key assignments, projects, portfolios, course work, student tests, etc.) were used? [**Check all that apply**]

☐ 1. Capstone project (e.g. theses, senior theses), courses, or experiences
☑ 2. Key assignments from required classes in the program
☐ 3. Key assignments from elective classes
☐ 4. Classroom based performance assessment such as simulations, comprehensive exams, or critiques
☑ 5. External performance assessments such as internships or other community-based projects
☐ 6. E-Portfolios
☐ 7. Other Portfolios
☐ 8. Other, specify:

[   ]

Q3.3.2.
Please **1) provide and/or attach the direct measure** (key assignments, projects, portfolios, course work, student tests, etc.) you used to collect data, **THEN 2) explain here** how it assesses the PLO:

Test-embedded questions used in Phil 103 (Business and Computer Ethics) and **the respective performance indicators** they assessed are as follows:

(1) Describe the phenomenon of motivated blindness? How might we expect our susceptibility to it to lead to moral failure? Discuss at least one example to illustrate your answer."   Assessing f-1

(2) A state of nature is a state of affairs where participants enjoy something like blameless liberty with respect to their behavior. Describe a few ways that the internet is and isn't like a state of nature. Should the internet generally *be treated* as a state of nature? How does your answer interact with arguments concerning the limits and scope of cyber-expression?   Assessing f-3

(3) Evaluate the following statement as either true or false (and make an argument for why it's true, or why it's false, defending your evaluation from at least one objection): 'FCC public utility-style regulation is essential for ensuring access neutrality for online content.'   Assessing f-3

(4) What kind of tragedy is supposed to befall common pool resources? Explain why it occurs.   Assessing f-4

(5) Randy is very good with computers and electronics and has a real fondness for knowing about you *all about you*. He uses computers secretly to search your financial records, your medical records, and your criminal records. Randy watches you by hacking your webcam. You know nothing about any of this. Randy never uses any of your information for anything other than his personal entertainment. Choose one of the statements below to defend as more plausible than the other statement.

a. Although it is creepy that Randy does all this, he does not directly interfere with your autonomy. Privacy is not necessarily essential to autonomy.

b. Randy's actions directly interfere with your autonomy. Privacy is essential to the exercise of one's autonomy."

Assessing f-4

Test-embedded question used in CSC 138 (Computer Networks and Internets) and **the performance indicator** it assessed are as follows:

(1) What is packet sniffing (example tool: Wireshark)?   How to prevent our confidential information (such as user passwords) from being intercepted by Wireshark?   Assessing f-2

A survey (evaluation form) was completed by employers of students in CSC 195 (Field Work) who worked as interns in companies or state/federal agencies during their junior or senior year.   See details in Q2.3.

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Q3.4.
What tool was used to evaluate the data?
- ⦿ 1. **No** rubric is used to interpret the evidence (skip to **Q3.4.4.**)
- ○ 2. Used rubric developed/modified by the faculty who teaches the class (skip to **Q3.4.2.**)
- ○ 3. Used rubric developed/modified by a group of faculty (skip to **Q3.4.2.**)
- ○ 4. Used rubric pilot-tested and refined by a group of faculty (skip to **Q3.4.2.**)
- ○ 5. The VALUE rubric(s) (skip to **Q3.4.2.**)
- ○ 6. Modified VALUE rubric(s) (skip to **Q3.4.2.**)
- ○ 7. Used other means (Answer **Q3.4.1.**)

Q3.4.1.
If you used other means, which of the following measures was used? [**Check all that apply**]
- ☐ 1. National disciplinary exams or state/professional licensure exams (skip to **Q3.4.4.**)
- ☐ 2. General knowledge and skills measures (e.g. CLA, ETS PP, etc.) (skip to **Q3.4.4.**)
- ☐ 3. Other standardized knowledge and skill exams (e.g. ETC, GRE, etc.) (skip to **Q3.4.4.**)
- ☐ 4. Other, specify:

(skip to **Q3.4.4.**)

Q3.4.2.
Was the **rubric** aligned directly and explicitly **with the PLO**?
- ○ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ⦿ 4. N/A

Q3.4.3.
Was the **direct measure** (e.g. assignment, thesis, etc.) aligned directly and explicitly **with the rubric**?
- ○ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ⦿ 4. N/A

Q3.4.4.
Was the **direct measure** (e.g. assignment, thesis, etc.) aligned directly and explicitly **with the PLO**?
- ⦿ 1. Yes
- ○ 2. No
- ○ 3. Don't know
- ○ 4. N/A

Q3.5.
Please enter the number (#) of faculty members who participated in planning the assessment data **collection** of the selected PLO?

3

Q3.5.1.
Please enter the number (#) of faculty members who participated in the **evaluation** of the assessment data for the selected PLO?

5

Q3.5.2.
If the data was evaluated by multiple scorers, was there a norming process (a procedure to make sure everyone was scoring similarly)?
- ○ 1. Yes

○ 2. No
○ 3. Don't know
◉ 4. N/A

Q3.6.
How did you **select** the sample of student work (papers, projects, portfolios, etc.)?

The nature of samples was determined by the faculty who teach the corresponding courses.

Q3.6.1.
How did you **decide** how many samples of student work to review?

In Phil 103 Business and Computer Ethics, the evaluation included all the students who were enrolled in a randomly selected section of Phil 103 in Fall 2017.

In CSC 138 Computer Networks and Internets, the evaluation included all the students who were enrolled in CSC 138 in Spring 2018.

In CSC 195 (Field Work), the evaluation included all the students who parcitipated in internships in Fall 2017 and Spring 2018 in CSC 195.

Q3.6.2.
Please enter the number (#) of students that were in the class or program?

For Phil 103, 39 students
For CSC 138, 33 students
For CSC 195 (Field Work), 38 students

Q3.6.3.
Please enter the number (#) of samples of student work that you evaluated?

For Phil 103, 39 students
For CSC 138, 33 students
For CSC 195 (Field Work), 38 students

Q3.6.4.
Was the sample size of student work for the direct measure adequate?
◉ 1. Yes
○ 2. No
○ 3. Don't know

(Remember: Save your progress)

Question 3B: Indirect Measures (surveys, focus groups, interviews, etc.)

Q3.7.
Were indirect measures used to assess the PLO?
○ 1. Yes
◉ 2. No (skip to **Q3.8**)

○ 3. Don't Know (skip to **Q3.8**)

Q3.7.1.
Which of the following indirect measures were used? [**Check all that apply**]

☐ 1. National student surveys (e.g. NSSE)
☐ 2. University conducted student surveys (e.g. OIR)
☐ 3. College/department/program student surveys or focus groups
☐ 4. Alumni surveys, focus groups, or interviews
☐ 5. Employer surveys, focus groups, or interviews
☐ 6. Advisory board surveys, focus groups, or interviews
☐ 7. Other, specify:

[   ]

Q3.7.1.1.
Please explain and attach the indirect measure you used to collect data:

| |
| |

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Q3.7.2.
If surveys were used, how was the sample size **decided**?

Q3.7.3.
If surveys were used, how did you **select** your sample:

Q3.7.4.
If surveys were used, please enter the response rate:

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Question 3C: Other Measures
(external benchmarking, licensing exams, standardized tests, etc.)

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Q3.8.
Were external benchmarking data, such as licensing exams or standardized tests, used to assess the PLO?
- ○ 1. Yes
- ◉ 2. No (skip to **Q3.8.2**)
- ○ 3. Don't Know (skip to **Q3.8.2**)

Q3.8.1.
Which of the following measures was used? [**Check all that apply**]
- ☐ 1. National disciplinary exams or state/professional licensure exams
- ☐ 2. General knowledge and skills measures (e.g. CLA, ETS PP, etc.)
- ☐ 3. Other standardized knowledge and skill exams (e.g. ETC, GRE, etc.)
- ☐ 4. Other, specify:

Q3.8.2.
Were other measures used to assess the PLO?
- ○ 1. Yes
- ◉ 2. No (skip to **Q4.1**)
- ○ 3. Don't know (skip to **Q4.1**)

Q3.8.3.
If other measures were used, please specify:

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Question 4: Data, Findings, and Conclusions

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Q4.1.
Please provide tables and/or graphs to summarize the assessment data, findings, and conclusions for the selected PLO in **Q2.1** (see Appendix 12 in our Feedback Packet Example):

The direct measures used in the assessment of the performance indicators of PLO (f) and their results are provided in Table 1.   All the performance indicators meet or exceed the targeted success rate (i.e., 70%).

Table 1. Results of direct measures used to assess PLO (f) in 2017-2018 cycle

Performance Indicator	Core Courses		

		Direct Measure	% Meeting or Exceeding Target (n = sample size)
f-1. Know, understand, and practice professional codes of conduct (*i.e., ACM Code of Ethics and Professional Conduct, IEEE Code of Ethics, ACM/IEEE Software Engineering Code of Ethics and Professional Practice.)	PHIL 103	Quiz/Test Question	90% (n= 39)
f-2 Understand need for and use of proper security features.	CSC 138	Quiz/Test Question	85% (n=33)
f-3. Be able to evaluate the ethical dimensions of a computer solution to a problem.	PHIL 103	Quiz/Test Question	90% (n= 39)
f-4. Understand moral and ethical dimensions of a computer solution to a problem.	PHIL 103	Quiz/Test Question	91% (n= 39)

Table 2 shows the results for intern student evaluations by their supervisors. As mentioned in Q3.2.1, the survey completed by the supervisors included one perforamnce indicator that is related to the PLO: Awareness of ethical and societal concerns". An Average rating meets the performance target. The results in the table show that 100% of the students included in the study received ratings of Average or better in the criterion. These results strongly indicate that our students' supervisors were generally very satisfied with the PLO-related performance of our students during their internships.

Table 2: Results of Intern Student Evaluation by Supervisors.

Criterion	Outstanding	Above Average	Average	Below Average	Weak	Did Not Observe	% Meeting or Exceeding Target (n = sample size)
Awareness of ethical and societal concerns	25	7	3	0	0	3	100% (n=38)

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Q4.2.
Are students doing well and meeting the program standard? **If not**, how will the program work to improve student performance of the selected PLO?

As discussed in Q4.1, the assessment results for both methods show that the percentage of students meeting or exceeding the performance standards is well above the target percentage of 70%. For PHIL 103 and CSC 138, the percentages ranged from 85% to 91%. For interns, the percentage was 100%.

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Q4.3.
For the selected PLO, the student performance:
- ⦿ 1. **Exceeded** expectation/standard
- ○ 2. **Met** expectation/standard
- ○ 3. **Partially** met expectation/standard
- ○ 4. Did not meet expectation/standard
- ○ 5. No expectation/standard has been specified
- ○ 6. Don't know

Question 4A: Alignment and Quality

Q4.4.
Did the data, including the direct measures, from all the different assessment tools/measures/methods directly align with the PLO?
- ⦿ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Q4.5.
Were **all** the assessment tools/measures/methods that were used good measures of the PLO?
- ⦿ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Question 5: Use of Assessment Data (Closing the Loop)

Q5.1.
As a result of the assessment effort and based on prior feedback from OAPA, do you anticipate *making any changes* for your program (e.g. course structure, course content, or modification of PLOs)?
- ⦿ 1. Yes
- ○ 2. No (skip to **Q5.2**)
- ○ 3. Don't know (skip to **Q5.2**)

Q5.1.1.
Please describe *what changes* you plan to make in your program as a result of your assessment of this PLO.

Since last year, we have been working on the developement of a new assessment plan which will include the updated PLOs and their respective performance indicators to keep our department up-to-date by aligning with the new student outcomes updated by ABET in 2017. We are planning to switch to a new assessment plan begining with the 2018-2019 AY. We anticipate significant work to ensure a smooth and successful transition.

Q5.1.2.
Do you have a plan to assess the *impact of the changes* that you anticipate making?

◉ 1. Yes, describe your plan:

We plan to finalize the new PLOs and all the performance indicators at the begining of the Fall 2018 semester. We anticipate implementing the new assessment plan starting with the 2018-2019 AY, the first year of the next three-year assessment cycle.

○ 2. No
○ 3. Don't know

Q5.2.

To what extent did you apply **previous assessment results** collected through your program in the following areas?	1. Very Much	2. Quite a Bit	3. Some	4. Not at All	5. N/A
1. Improving specific courses	○	◉	○	○	○
2. Modifying curriculum	○	○	◉	○	○
3. Improving advising and mentoring	○	○	◉	○	○
4. Revising learning outcomes/goals	◉	○	○	○	○
5. Revising rubrics and/or expectations	◉	○	○	○	○
6. Developing/updating assessment plan	◉	○	○	○	○
7. Annual assessment reports	◉	○	○	○	○
8. Program review	○	◉	○	○	○
9. Prospective student and family information	○	○	◉	○	○
10. Alumni communication	○	○	○	○	◉
11. WSCUC accreditation (regional accreditation)	○	◉	○	○	○
12. Program accreditation	◉	○	○	○	○
13. External accountability reporting requirement	○	○	○	○	◉
14. Trustee/Governing Board deliberations	○	○	○	○	◉
15. Strategic planning	○	○	◉	○	○
16. Institutional benchmarking	○	○	○	○	◉

	1.	2.	3.	4.	5.
17. Academic policy development or modifications	○	○	◉	○	○
18. Institutional improvement	○	○	○	○	◉
19. Resource allocation and budgeting	○	○	◉	○	○
20. New faculty hiring	○	○	◉	○	○
21. Professional development for faculty and staff	○	○	◉	○	○
22. Recruitment of new students	○	○	○	○	◉
23. Other, specify:	○	○	○	○	○

Q5.2.1.
Please provide a detailed example of how you used the assessment data above:

Although all the performance indicators of the PLOs being assessed last year meet or exceed the target, based on the previous assessment experience, this year we have made an effort to revise the performance indicators used in PLO (g) Write effectively (e.g., using action verbs) in order to make them clearer and more measurable. We have also redesigned the rubric used to assess performance indicators for PLO (g), as detailed in Q 1.2.

Q5.3. To what extent did you apply **previous assessment feedback** from the Office of Academic Program Assessment in the following areas?	1. Very Much	2. Quite a bit	3. Some	4. Not at All	5. N/A
1. Program Learning Outcomes	○	◉	○	○	○
2. Standards of Performance	○	◉	○	○	○
3. Measures	◉	○	○	○	○
4. Rubrics	◉	○	○	○	○
5. Alignment	○	◉	○	○	○
6. Data Collection	◉	○	○	○	○
7. Data Analysis and Presentation	○	○	◉	○	○
8. Use of Assessment Data	○	○	◉	○	○
9. Other, please specify:	○	○	○	○	○

Q5.3.1.
Please share with us an example of how you applied **previous feedback** from the Office of Academic Program Assessment in any of the areas above:

Based on the feedback received from OAPA last year, in evaluating PLO (g), we adopted a norming precess to make sure all the faculty who participated in the evaluation would assess student work in a consistent way. 16 faculty members participated in the evalation of PLO (g) and they are grouped into faculty-pairs. Each faculty-pair was given the rubric and five student papers to evaluate. Faculty evaluated each student paper in terms of the five performance indicators using the following scoring mechanism: 4 - Exceeds criterion; 3 - Satisfies criterion; 2 - Approaches criterion; 1 - Does not (or fails to) satisfy criterion. Each faculty member was tasked to work with her/his partner to compare and discuss their scores and then submit the agreed upon score to the program assessment coordinator.

(Remember: Save your progress)

Section 3: Report Other Assessment Activities

Other Assessment Activities

Q6.
If your program/academic unit conducted assessment activities that are **not directly related to the PLOs** for this year (i.e. impacts of an advising center, etc.), please provide those activities and results here:

[U] No file attached   [U] No file attached

Q6.1.
Please explain how the assessment activities reported in **Q6** will be linked to any of your PLOs and/or PLO assessment in the future and to the mission, vision, and the strategic planning for the program and the university:

Q7.
What PLO(s) do you plan to assess next year? [**Check all that apply**]
- [ ] 1. **Critical Thinking**
- [ ] 2. **Information Literacy**
- [ ] 3. **Written Communication**
- [ ] 4. **Oral Communication**
- [ ] 5. Quantitative Literacy
- [ ] 6. **Inquiry and Analysis**
- [ ] 7. Creative Thinking
- [ ] 8. Reading
- [ ] 9. Team Work
- [ ] 10. Problem Solving
- [ ] 11. Civic Knowledge and Engagement
- [ ] 12. **Intercultural Knowledge, Competency, and Perspectives**

☐ 13. Ethical Reasoning
☐ 14. Foundations and Skills for Lifelong Learning
☐ 15. **Global Learning and Perspectives**
☐ 16. Integrative and Applied Learning
☐ 17. Overall Competencies for GE Knowledge
☑ 18. **Overall Disciplinary Knowledge**
☐ 19. **Professionalism**
☐ 20. Other, specify any PLOs not included above:

a. [   ]

b. [   ]

c. [   ]

Q8.
Please explain how this year's assessment activities help you address recommendations from your department's last program review?

The recommendations from the last program review were addressed in the following ways this year:

(1) VALUE rubric for written communication was clearly redesigned for student writting evaluation. Each VALUE criterion is used to assess a specific performance indicator.

(2) A norming process was designed and implemented in collecting assessment data for PLO (g). Faculty work together in group to discuss rating discrepancies. See Q 5.3.1 for details.

(3) The newly revised VALUE rubric was shared with students and faculty before evaluation.

Q9. Please attach any additional files here:

| 📎 No file attached | 📎 No file attached |
| 📎 No file attached | 📎 No file attached |

Q9.1.
If you have attached **any** files to this form, please list **every** attached file here:

[   ]

Section 4: Background Information about the Program

Program Information (**Required**)

Program:
[   ]
(If you typed in your program name at the beginning, please skip to **Q11**)

Q10.
Program/Concentration Name: [skip if program name is already selected or appears above]
BS Computer Science

Q11.
Report Author(s):

Haiquan Chen

Q11.1.
Department Chair/Program Director:

Cui Zhang

Q11.2.
Assessment Coordinator:

Haiquan Chen

Q12.
Department/Division/Program of Academic Unit (select):

Computer Science

Q13.
College:

College of Engineering and Computer Science

Q14.
What is the total enrollment (#) for Academic Unit during assessment (see Departmental Fact Book):

1202

Q15.
Program Type:
- ◉ 1. Undergraduate baccalaureate major
- ◯ 2. Credential
- ◯ 3. Master's Degree
- ◯ 4. Doctorate (Ph.D./Ed.D./Ed.S./D.P.T./etc.)
- ◯ 5. Other, specify:

Q16. Number of **undergraduate degree programs** the academic unit has?
2

Q16.1. List all the names:

BS in computer science

BS in computer engineering, joint program with
electrical engineering

Q16.2. How many concentrations appear on the diploma for this undergraduate program?
0

Q17. Number of **master's degree programs** the academic unit has?
3

Q17.1. List all the names:

Computer Science

Computer Engineering

Software Engineering

Q17.2. How many concentrations appear on the diploma for this master's program?
0

Q18. Number of **credential programs** the academic unit has?

0

Q18.1. List all the names:

Q19. Number of **doctorate degree programs** the academic unit has?

0

Q19.1. List all the names:

When was your **Assessment Plan**...	1. Before 2012-13	2. 2013-14	3. 2014-15	4. 2015-16	5. 2016-17	6. 2017-18	7. No Plan	8. Don't know
Q20. Developed?	◉	○	○	○	○	○	○	○
Q20.1. Last updated?	○	○	◉	○	○	○	○	○

Q20.2. (Required)
Please **obtain** and **attach** your latest **assessment plan**:

> **CS_BS_Assessment_Plan.docx**
> **23.45 KB**

Q21.
Has your program developed a **curriculum map?**
- ◉ 1. Yes
- ○ 2. No
- ○ 3. Don't know

Q21.1.
Please **obtain** and **attach** your latest **curriculum map**:

> 4 Year Plan Template (CSC) ALR June 3 2014.docx
> 169.31 KB

Q22.
Has your program indicated explicitly in the curriculum map where assessment **of student learning** occurs?
- ○ 1. Yes
- ◉ 2. No
- ○ 3. Don't know

Q23.
Does your program have a capstone class?
- ◉ 1. Yes, specify:

CSC 190/191

- ○ 2. No

○ 3. Don't know

Q23.1.
Does your program have a capstone project(s)?
◉ 1. Yes
○ 2. No
○ 3. Don't know

(**Remember**: **Save your progress**)
Save When Completed!

ver. 10.**31**.17

B.S. Computer Science Three-Year Assessment Plan for Student Outcomes

Year	Outcomes Assessed (Abbreviated Form)	Courses	Data Collected	Continuous Improvement
Year 1 (2015-2016)	(a) Application of fundamental knowledge	CSC 130, 133, 134, 135, 137, 138, and 139	Direct assessment in course-embedded exam questions, assignments, and projects Supervisor evaluation of student interns	Analyze results of assessment of SOs (a)-(d) and make recommendations for the performance indicators that are below the standard (target success rate of 70%). Implement previous year's faculty recommendations for performance indicators for SOs (g) and (h) that are below minimum and re-assess these indicators.
	(b) Computer system development cycle	CSC 131, 137, 138, 139, and 190/191		
	(c) Application of software development principles	CSC 131, 133, 138, and 190/191		
	(d) Application of skills, techniques, and tools for computing practice	CSC 133, 134, 135, 137, 139, and 195/195A		
Year 2 (2016-2017)	(e) Team work	CSC 131, 190/ 191, and 195/195A	Instructor evaluation Student self-assessment and reflection Supervisor evaluation of student interns	Analyze results of assessment of SO (e) and SO (f) and make recommendations for performance indicators below standard. Implement previous year's faculty recommendations for performance indicators for SOs (a) - (d) that are below minimum and, re-assess these indicators.
	(f) Oral Communication	CSC 131, 190/191, and 195/195A	Faculty evaluation of student oral presentations using a rubric Supervisor evaluation of student interns	
Year 3 (2017-2018)	(g) Professional, ethical, and security issues and responsibilities	CSC 138, 190/191, and 195/195A; PHIL 103	Course-embedded exam questions Student surveys Faculty evaluation of written essays Supervisor evaluation of student interns	Analyze results of assessment of SO (g) and SO (h) and make recommendations for performance indicators below standard. Implement previous year's faculty recommendations for performance indicators for SO (e) and SO (f) that are below minimum and. re-assess these indicators.
	(h) Written communication	CSC 190/191 and 195/195A	Faculty evaluation of written reports using a rubric Supervisor evaluation of student interns	

The expected level of attainment for each of the student outcomes.
For each performance indicator, the percentage of student responses meeting or exceeding the performance standard is computed. Then, for each outcome, the average of the percentages for all relevant performance indicators is computed. If the average percentage for an outcome is greater than or equal to 70%, the outcome is considered to be satisfied. Although, in the past, the minimum standard was set at 75%, the faculty decided in 2013-2014 to use a 70% standard since it is common practice to consider a score of 70% to be a passing grade.

Correspondence between Upper Division Required Courses and Student Outcomes

Outcomes / Courses	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
CSC 130	X			X				
CSC 131	X	X	X	X	X	X	X	X
CSC 133	X	X	X	X				
CSC 134	X			X				
CSC 135	X	X	X	X				
CSC 137	X	X		X				
CSC 138	X	X	X	X		X		
CSC 139	X	X		X		X		
CSC 190/191	X	X	X	X	X	X	X	**X**
CSC 192 & CSC 194						X	X	
CSC 195 & CSC 195A	X	X	X	X	X	X	X	X
CSC 198 & CSC 199	X	X		X		X		

Student Outcomes and Performance Indicators

	Performance Indicator	Core Course
	a-1. Understand fundamental algorithms and essential data structures.	CSC 130
	a-2. Understand trade-offs in the selection of algorithms and data structures.	CSC 130
	a-3. Understand and apply mathematical transformations and algorithms for 2D graphics.	CSC 133
	a-4. Understand and use relational databases.	CSC 134
	a-5. Understand distinctive features of the design of programming languages.	CSC 135
	a-6. Demonstrate knowledge of abstract machines, languages, and grammars.	CSC 135
(a) Apply fundamental knowledge of mathematics, algorithmic principles, computer theory, and principles of computing systems in the modeling and design of computer-based systems that demonstrate an understanding of tradeoffs involved in design choices.	a-7. Understand and apply the logic programming paradigm.	CSC 135
	a-8. Understand and apply the functional programming paradigm.	CSC 135
	a-9. Demonstrate the ability to calculate performance parameters, such as, circuit propagation delay, memory latency, speedup, etc.	CSC 137
	a-10. Understand network architecture, layered model, and protocol stacks.	CSC 138
	a-11. Demonstrate the working knowledge of network management including monitoring, measurement, analysis, and control.	CSC 138
	a-12. Understand principles of concurrency and tradeoffs in synchronization approaches, analysis, and control.	CSC 139
	a-13. Understand deadlocks and their solutions.	CSC 139
	a-14. Understand principles of resource management.	CSC 139

	b-1. Understand and apply modeling and analysis techniques.	CSC 131, 190/191
	b-2. Understand and apply requirements engineering process.	CSC 131, 190/191
	b-3. Understand and apply design principles.	CSC 131*, 190/191
(b) Analyze a problem, specify the requirements, design, implement, and evaluate a computer-based system, process, component, or program that satisfies the requirements.	b-4. Understand and apply proper testing techniques	CSC 131*, 190/191
	b-5. Understand and apply project management processes and tools.	CSC 131, 190/191
	b-6. Demonstrate the ability to design and analyze basic and complex hardware components.	CSC 137
	b-7. Understand and apply error detection and correction, flow control, and congestion control principles.	CSC 138
	b-8. Understand and apply synchronization mechanisms to the critical section problem and to the process coordination.	CSC 139
	c-1. Understand and use software metrics.	CSC 131
	c-2. Understand and use object-oriented design.	CSC 131*, 133
	c-3. Understand and use design patterns.	CSC 133
(c) Apply design and development principles in the construction of software systems of varying complexity.	c-4. Understand and use verification and validation techniques.	CSC 131, 190/191
	c-5. Understand and apply documentation standards.	CSC 131, 190/191
	c-6. Understand and apply semi-formal modeling languages, such as, UML, in requirement specification and design.	CSC 190/191
	c-7. Demonstrate the ability to develop communication protocols and networking applications.	CSC 138

	d-1. Implement event-driven GUI applications.	CSC 133
	d-2. Demonstrate competence in using SQL.	CSC 134
(d) Use current skills, techniques, and tools necessary for computing practice.	d-3. Demonstrate competence in programming in a variety of programming paradigms.	CSC 135
	d-4. Demonstrate competence in language scanning and parsing.	CSC 135
	d-5. Demonstrate the ability to use hardware design simulation tools.	CSC 137
	d-6. Demonstrate competence in system programming in Unix/Linux environments.	CSC 139
(e) Function effectively as a team to accomplish a common goal.	e-1 Cooperate and collaborate as a team member.	CSC 191
	e-2. Communicate and listen; keep teammates informed.	CSC 191
	e-3. Face conflicts and resolve most differences.	CSC 191
	e-4 Contribute equally as a participant in the project.	CSC 191
(f) Understand professional, ethical, and security issues and responsibilities.	f-1. Know, understand, and practice professional codes of conduct (*i.e., ACM Code of Ethics and Professional Conduct, IEEE Code of Ethics, ACM/IEEE Software Engineering Code of Ethics and Professional Practice.)	PHIL 103, CSC 190/191
	f-2 Understand need for and use of proper security features.	CSC 138
	f-3. Be able to evaluate the ethical dimensions of a computer solution to a problem.	PHIL 103
	f-4. Understand moral and ethical dimensions of a computer solution to a problem.	PHIL 103

	g-1. Focus – responds to the questions asked.	CSC 191
	g-2. Structure – well-organized, consistent style, and smooth transitions	CSC 191
(g) Write effectively.	g-3 Sentence Structure – use of language: clearly communicates ideas, uses correct syntax, grammar, and spelling. Word Choice – use and placement of words are appropriate.	CSC 191
	g-4. Paragraph Structure – well-written paragraphs on topic and understandable.	CSC 191
	g-5. Problem Statement – objective, nature of challenges, and value of project are clear; purpose is clear.	CSC 191
	g-6. Design Requirements – specifications complete and design constraints identified.	CSC 191
(h) Give effective oral presentations.	h-1. Effective style and delivery.	CSC 131, 191
	h-2. Correct language and vocabulary	CSC 131, 191
	h-3. Good organization	CSC 131, 191
	h-4. Clear communication of technical content	CSC 131, 191
	h-5. Project related issues	CSC 191

COMPUTER SCIENCE

FOUR ♦ YEAR PLAN

Minimum total units required for B.S. Degree: 120* ▪ (81 units required from Major department)
▪ Additional courses may be needed to meet graduation requirements
This form is designed to be used in partnership with GE and Major advisors - modifications may be necessary to meet the unique needs of each student. See your major adviser each semester to stay on track and graduate! Consult the department website for detailed advising on the math/science requirements

YEAR 1						
Sem. 1	CSC 15	MATH 26A/30 (B4)	A1:	A2:	E:	15-16 UNITS
Sem. 2	CSC 20	MATH 26B/31 (B5)	A3:	B2:	D: U.S. HIST	15-16 UNITS

YEAR 2						
Sem. 3	CSC 28	CSC 35	PHYS 5A/11A (B1 & B3)	College Comp.	C1 or C2:	16 UNITS
Sem. 4	CSC 60	CSC 130	Math/Science Elec. †	D:	D: U.S. GOVT	15-17 UNITS

YEAR 3						
Sem. 5	CSC 131	CSC 134	STAT 50/ ENGR 115	D: PHIL 103 (UD GE)	C1 or C2:	14-16 UNITS
Sem. 6	CSC 133	CSC 135	CSC 137	Math/Science Elec. †	C1: UD GE *	15-17 UNITS

YEAR 4						
Sem. 7	CSC 139	CSC 190	CSC 138	CSC Elective	C2: UD GE +	15 UNITS
Sem. 8	CSC 191	CSC (2 x 1 unit 19X)	CSC Elective	Math/Science Elec. †	CSC Elective	12-14 UNITS

KEY:
- Major requirements
- CSC Electives
- GE/graduation requirements
- Math/Science Electives

UD	Upper Division
+	Race & Ethnicity
*	Writing Intensive (Complete WPJ or substitute ENGL 109W/M for elective before enrolling)
†	Students must take math/science electives to bring the total number of math and science units to a minimum of 24 (excluding CSC 28 & the GE B2 course)

NOTES:
Sequencing in required upper division courses should be determined on the basis of pre-requisites and preparation for CSC electives. Those electives are not offered every semester. A tentative two year offering plan is available in the department office.

TOTAL = 120 UNITS

SACRAMENTO STATE