Program Name: BS Mechanical Engineering

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 competencies in the major/discipline
☐	19. **Professionalism**
☐	20. Other, specify any PLOs that were assessed but not included above:

    a.

    b.

    c.

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

The specific PLO we assessed in 2016-17 was closely aligned with the University "**Overall competencies in the major**" and is specifically: *An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability*

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, other (please 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)?

☒	1. Yes
☐	2. No (Go to **Q1.5**)
☐	3. Don't know (Go 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?

[X] 1. Yes
[ ] 2. No
[ ] 3. Don't know

Q1.5. Did your program use the *Degree Qualification Profile* (DQP) to develop your PLO(s)?

[ ] 1. Yes
[X] 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 (See Attachment I)?

[X] 1. Yes
[ ] 2. No
[ ] 3. Don't know

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*IN QUESTIONS 2 THROUGH 5, REPORT IN DETAIL ON **ONE PLO** THAT YOU ASSESSED*

Question 2: Standard of Performance for the selected PLO

Q 2.1. Select **ONE(1) PLO** here as an example to illustrate how you've conducted assessment (be sure you *checked the correct box* for this PLO in Q1.1):

[ ] 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
[X] 18. Overall competencies in the major/discipline
[ ] 19. **Professionalism**
[ ] 20. Other, specify any PLOs that were assessed but not included above:
   a.
   b.
   c.

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

The specific PLO we assessed in 2016-17 was closely aligned with the University "Overall competencies in the major" and is specifically: *An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability*

This PLO is one of 11 PLOs we assess to remain ABET accredited which is essential for the BS in Mechanical Engineering.

The assessment of this PLO was selected because of comments we have been receiving from graduating students and our Industry Advisory Board with suggestions of how to strengthen our major.

Q2.2. Has the program developed or adopted **explicit** standards of performance for this PLO?

[X] 1. Yes
[ ] 2. No
[ ] 3. Don't know
[ ] 4. N/A

Q2.3. Please provide the rubric(s) and **standard of performance** that you have developed for this PLO here or in the appendix:
[Word limit: 300]
See Appendix

Please indicate where you have published the PLO, the standard of performance, and the rubric that measures the PLO:	Q2.4 (1) PLO	Q2.5 (2) Standards of Performance	Q2.6 (3) Rubrics
1. In **SOME** course syllabi/assignments in the program that address the PLO		X	X
2. In **ALL** course syllabi/assignments in the program that address the PLO	X		
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	X	X	X
7. In new course proposal forms in the department/college/university			
8. In the department/college/university's strategic plans and other planning documents	X	X	X
9. In the department/college/university's budget plans and other resource allocation documents			
10. Other, specify:			

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?

[X] 1. Yes
[ ] 2. No (Skip to **Q6**)
[ ] 3. Don't know (Skip to **Q6**)
[ ] 4. N/A (Skip to **Q6**)

Q3.2. If yes, was the data **scored/evaluated** for this PLO?

[X] 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? Three	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 (see Attachment II)? **[Word limit: 300]** 1. Exams and reports in ME 138 and ME 190 2. Graduating student Exit Interviews 3. Evaluations from Industry Advisory Board

Q3A: Direct Measures (key assignments, projects, portfolios)

Q3.3. Were direct measures [key assignments, projects, portfolios, course work, student tests, etc.] used to assess this PLO? [X] 1. Yes [ ] 2. No (Go to **Q3.7**) [ ] 3. Don't know (Go to **Q3.7**)	Q3.3.1. Which of the following direct measures were used? **[Check all that apply]** [X] 1. Capstone projects (including theses, senior theses), courses, or experiences [X] 2. Key assignments from required classes in the program [ ] 3. Key assignments from elective classes [X] 4. Classroom based performance assessments such as simulations, comprehensive exams, critiques [ ] 5. External performance assessments such as internships or other community based projects [ ] 6. E-Portfolios [ ] 7. Other portfolios [X] 8. Other measure. Specify: Industry partner evaluations of projects
Q3.3.2. Please **provide** the direct measure you used to collect data, THEN **explain** how it assesses the PLO: Exams and project reports from ME 138 and ME 190 ME 138 develops the analytical and design skills required of all Mechanical Engineers. It is the key junior level course in which concepts from all areas are integrated and evaluated. ME 190, Project Engineering I, is the first term of the Senior Project to which the entire BS ME curriculum builds. Evaluation of the skills and ability to demonstrate those skills is key to ensuring the graduates will be ready to enter the workforce after their final semester.	

Q3.4. How was the data evaluated? **[Select only one]** [ ] 1. **No** rubric is used to interpret the evidence (Go to **Q3.4.4**) [ ] 2. Used rubric developed/modified by the faculty who teaches the class [X] 3. Used rubric developed/modified by a group of faculty [ ] 4. Used rubric pilot-tested and refined by a group of faculty [ ] 5. The VALUE rubric(s) [ ] 6. Modified VALUE rubric(s) [ ] 7. Used other means (Answer **Q3.4.1**)	Q3.4.1. **If** you used other means, which of the following measures were used? **(Check all that apply)** [ ] 1. National disciplinary exams or state/professional licensure exams [ ] 2. General knowledge and skills measures (e.g., CLA, CAAP, ETS PP, etc.) [ ] 3. Other standardized knowledge and skill exams (e.g., ETS, GRE, etc.) [ ] 4. Other, specify:

Q3.4.2. Was the **rubric** aligned directly and explicitly **with the PLO**? [X] 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**? [X] 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**? [X] 1. Yes [ ] 2. No [ ] 3. Don't know [ ] 4. N/A
Q3.5. How many faculty members participated in planning the assessment data collection of the selected PLO? Four	Q3.5.1 How many faculty members participated in planning the evaluation of the assessment data for the selected PLO? Four	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 [ ] 4. N/A [X] 2. No [ ] 3. Don't know

Q3.6. How did you **select** the sample of student work [papers, projects, portfolios, etc.]? 25 ME 190 projects were evaluated selected randomly.	**Q3.6.1.** How did you **decide** how many samples of student work to review? There were approximately 50 projects in ME 190 total for the year- half were selected for evaluation.

Q3.6.2. How many students were in the class or program? Approximately 100 in each class each term	**Q3.6.3.** How many samples of student work did you evaluate? 25	**Q3.6.4.** Was the sample size of student work for the direct measure adequate? [X] 1. Yes [ ] 2. No [ ] 3. Don't know

Q3B: Indirect Measures (surveys, focus groups, interviews, etc.)

Q3.7. Were indirect measures used to assess the PLO? [X] 1. Yes [ ] 2. No (Skip to **Q3.8**) [ ] 3. Don't know	**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) [X] 3. Program student surveys or focus groups [ ] 4. Alumni surveys, focus groups, or interviews [ ] 5. Employer surveys, focus groups, or interviews [X] 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: Graduating Senior Exit interview Curriculum review by Industry Advisory Group	
Q3.7.2 If surveys were used, how was the sample size decided? All students were solicited. There is about 80% response	
Q3.7.3. If surveys were used, how did you select your sample? All students were solicited and all responses were tallied	**Q3.7.4. If** surveys were used, what was the response rate? 80%

Q3C: Other Measures (external benchmarking, licensing exams, standardized tests, etc.)

Q3.8. Were external benchmarking data such as licensing exams or standardized tests used to assess the PLO? [ ] 1. Yes [X] 2. No (Go to **Q3.8.2**) [ ] 3. Don't know	**Q3.8.1.** Which of the following measures were used? **(Check all that apply)** [ ] 1. National disciplinary exams or state/professional licensure exams [ ] 2. General knowledge and skills measures (e.g., CLA, CAAP, ETS PP, etc.) [ ] 3. Other standardized knowledge and skill exams (e.g., ETS, GRE, etc.) [ ] 4. Other, specify:
Q3.8.2. Were other measures used to assess the PLO? [ ] 1. Yes [X] 2. No (Go to **Q4.1**)	**Q3.8.3.** If other measures were used, please specify:

	3. Don't know (Go to **Q4.1**)

Question 4: Data, Findings and Conclusions

Q4.1. Please provide simple tables and/or graphs to summarize the assessment data, findings, and conclusions: (see Attachment III)
[Word limit: 600 for selected PLO]

Students will demonstrate:
PLO c:
An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety,

⟹

Target performance for this assessment was that 90% of students would demonstrate "mastery" and all students would demonstrate "proficiency" (i.e., reported values within 1.0% of the true value).

⟹

Students were tasked with assignments (problems, projects and creative challenges) that mirror entry level expectations for BS Mechanical Engineering graduates

⟹

Findings were 92% demonstrated "mastery" and 8% "proficiency".

⟹

To close the loop, faculty are re-designing ME 138 to better simulate industry expectations to enhance the Project Engineering experience. This will provide more opportunities for integration of skills and success in all areas of the major.

Q4.2. Are students doing well and meeting program standard? If not, how will the program work to improve student performance of the selected PLO?
Yes. One of the assessed courses is being redesigned to better address the PLO.

Q4.3. For **selected** PLO, the student performance:

X	1. **Exceeded** expectation/standard
	2. **Met** expectation/standard
	3. **Partially** met expectation/standard
	4. **Did not meet** expectation/standard
	5. No expectation or standard has been specified
	6. Don't know

Q4A: 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?	**Q4.5.** Were **ALL** the assessment tools/measures/methods that were used good measures for the PLO?
X 1. Yes	1. Yes
2. No	X 2. No
3. Don't know	3. Don't know

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

Q5.1. As a result of this year's **assessment effort** and based on the prior feedback from OAPA, do you anticipate *making any changes* for your program (e.g., course structure, course content, or modification of PLOs)?

x	1. Yes
	2. No (Go to **Q5.2**)
	3. Don't know (Go to **Q5.2**)

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

x	1. Yes
	2. No
	3. Don't know

Q5.1.1. Please describe *what changes* you plan to make in your program as a result of your assessment of this PLO. Include a description of how you plan to assess the impact of these changes. **[Word limit: 300 words]**

The required Junior level *ME 138 – Concurrent Processes and Product Design* course will be reworked to better address this PLO and to prepare students more fully for the Product Design (capstone) sequence

The Exit Interview and the Industry Advisory Board review instruments will be evaluated to ensure that they better reflect the expectations and provided meaningful evaluations.

Q5.2. Since your last assessment report, **how have the assessment data from then been used** so far? [Check all that apply]

	(1) Very Much	(2) Quite a Bit	(3) Some	(4) Not at all	(8) N/A
1. Improving specific courses			X		
2. Modifying curriculum			X		
3. Improving advising and mentoring				X	
4. Revising learning outcomes/goals				X	
5. Revising rubrics and/or expectations				X	
6. Developing/updating assessment plan				X	
7. Annual assessment reports			X		
8. Program review				X	
9. Prospective student and family information					X
10. Alumni communication					X
11. WASC accreditation (regional accreditation)			X		
12. Program accreditation				X	
13. External accountability reporting requirement				X	
14. Trustee/Governing Board deliberations				X	
15. Strategic planning			X		
16. Institutional benchmarking				X	
17. Academic policy development or modification			X		
18. Institutional Improvement			X		
19. Resource allocation and budgeting				X	
20. New faculty hiring				X	
21. Professional development for faculty and staff				X	
22. Recruitment of new students				X	

23. Other Specify: The University Assessment program is a good tool for most programs that are not held to the discipline specific outside accreditation. For those like Engineering programs, the University assessment adds very little to our work.

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

Q5.3. To what extent did you apply **last year's 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				X	
2. Standards of Performance				X	
3. Measures				X	
4. Rubrics				X	
5. Alignment				X	
6. Data Collection				X	
7. Data Analysis and Presentation				X	
8. Use of Assessment Data				X	

9. Other, please specify:

Unfortunately with the small faculty and large number of students in the BS ME program, we did not have the resources to use any of the feedback

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

Additional Assessment Activities

Q6. Many academic units have collected assessment data on aspects of a program that are not related to PLOs (i.e., impacts of an advising center, etc.). **If** your program/academic unit has collected data on the program elements, please briefly report your results here. **[Word limit: 300]**

Q7. What PLO(s) do you plan to assess next year?

	1. **Critical thinking**
	2. **Information literacy**
X	3. **Written communication**
	4. **Oral communication**
	5. Quantitative literacy
	6. **Inquiry and analysis**
	7. Creative thinking
	8. Reading
X	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 competencies in the major/discipline
	19. **Professionalism**
	20. Other, specify any PLOs that were assessed but not included above:

a.

b.

c.

Q8. Have you attached any files to this form? If yes, please list every attached file here:

Appendix – Rubric for PLO

Program Information (Required)

Q9. Program/Concentration Name(s): BS in Mechanical Engineering **Q10.** Report Authors: Susan L. Holl	**Q10.1.** Department Chair/Program Director: Susan L. Holl **Q10.2.** Assessment Coordinator:
Q11. Academic unit: Department, Program, or College: Mechanical Engineering	**Q12.** College: Engineering & Computer Science

Q13. Fall 2015 enrollment for Academic unit *(See Department Fact Book by the Office of Institutional Research for fall enrollment)*: 941

Q14. Program Type: **[Select only one]**

X	1. Undergraduate baccalaureate major
	2. Credential
	3. Master's degree
	4. Doctorate (Ph.D./Ed.D./Ed.S./D.P.T./etc.)
	5. Other. Please specify:

Undergraduate Degree Program(s):
Q15. Number of undergraduate degree programs the academic unit has: 1

Q15.1. List all the name(s): BS in Mechanical Engineering

Q15.2. How many concentrations appear on the diploma for this undergraduate program? none

Master Degree Program(s):
Q16. Number of Master's degree programs the academic unit has: 1

Q16.1. List all the name(s): MS in Mechanical Engineering

Q16.2. How many concentrations appear on the diploma for this master program? None

Credential Program(s):
Q17. Number of credential programs the academic unit has: 0

Q17.1. List all the names:

Doctorate Program(s)
Q18. Number of doctorate degree programs the academic unit has: 0

Q18.1. List all the name(s):

When was your assessment plan… *(Please **obtain** and **attach** the assessment plan)*	1. Before 2011-12	2. 2012-13	3. 2013-14	4. 2014-15	5. 2015-16	6. 2016-17	7. No Plan	8. Do not Know
Q19. … developed?	X							
Q19.1. … last updated?					X			

	1. Yes	2. No	3. Don't Know
Q20. Have you developed a curriculum map for this program? *Please **obtain** and **attach** the curriculum map.*	X		
Q20.1. Has the program indicated explicitly where the assessment **of student learning** occurs in the curriculum?	X		
Q22. Does the program have a capstone class?	X		
Q22.1. Does the program have **ANY** capstone project?	X		

Student Outcome: (c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

Performance Indicator	Exemplary (Outstanding) 4	Satisfactory (Proficient) 3	Developing (Apprentice) 2	Unsatisfactory (Novice) 1	Total N=25
Define Design Constraints	Constructs a clear and insightful list of design constraints with evidence of all relevant contextual factors. (n=23, 92%)	Describes design constraints with evidence of most relevant contextual factors, and constraints are adequately detailed. (n=2, 8%)	Identifies design constraints with most relevant contextual factors, but description is superficial. (0%)	Identifies a limited number of design constraints or related contextual factors. (0%)	100%
Identify Design Strategies	Identifies multiple approaches for solving the problem that apply within a specific context. (n=20, 80%)	Identifies multiple approaches for solving the problem, only some of which apply within a specific context. (n=5, 20%)	Identifies only a single approach for solving the problem that does apply within a specific context. (0%)	Identifies one or more approaches for solving the problem that do not apply within a specific context. (0%)	100%
Propose Design Strategy	Proposes one or more strategies that indicate a deep comprehension of the constraints. Solutions are sensitive to contextual factors. (n=25, 100%)	Proposes one or more strategy that indicate comprehension of the design constraints. Strategies are sensitive to contextual factors of the problem.	Proposes one strategy that is generic in nature rather than individually designed to address the specific contextual factors. (0%)	Proposes a design strategy that is difficult to evaluate because it is vague or only indirectly addresses the project constraints. (0%)	100%

		(0%)			
Evaluate Design Strategy	Complete analysis of proposed strategy relative to all key design constraints. (n=24, 96%)	Analysis of proposed strategy fails to adequately address at most one key design constraint. (n=1, 4%)	Analysis of proposed strategy fails to address multiple key design constraints. (0%)	Evaluation is superficial in general or fails to adequately address most of the key design constraints (0%)	100%

Total: 92% Exemplary (Mastery), 8% Proficiency