Question 1: Program Learning Outcomes

Q1.1. Which of the following Program Learning Outcomes (PLOs) and Sac State Baccalaureate Learning Goals (BLGs) **did you assess in 2014-2015**? **[Check all that apply]**

	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
	9. Team work
	10. Problem solving
	11. Civic knowledge and engagement
	12. Intercultural knowledge and competency
	13. Ethical reasoning
	14. Foundations and skills for lifelong learning
	15. Global learning
	16. Integrative and applied learning
	17. Overall competencies for GE Knowledge
	18. Overall competencies in the major/discipline
	19. Other, specify any PLOs that were assessed in 2014-2015 but not included above:

   a.
   b.
   c.

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?
- [ ] 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
- [ ] 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)?

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

The MS ME program has four Program Educational Objectives:
- A. Technical and Professional Maturity
- B. Knowledge and Analysis
- C. Creativity
- D. Communication

Specific assessment components are presented in Appendix I.

During the 2014-15 academic year we focused on PLO D: *Will communicate effectively through speaking, writing, and graphics.* Specifically we focused on *written communication*. We have already published and widely distributed a Thesis Scoring rubric that was developed in conjunction with faculty from the Department of English and the Reading and Writing Sub-Committee of the Senate GE Committee. (Appendix II). The ME MS is a "thesis only" program; the culminating experience for all ME MS students is completion of a thesis supervised by an ME faculty member.

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
- [ ] N/A, other (please specify):

Criteria: D.1 – **Effectiveness of the Thesis**
                   D.2 – **Focus of Thesis**
                   D.3 – **Support**
                   D.4 – **Organization**
                   D.5 – **Style**
                   D.6 – **Grammar and Mechanics**
 	
The rubric was developed specifically for evaluating technical thesis writing. Effective written communication is essential for success as an engineer. Although this rubric was developed in conjunction with assistance from English Composition faculty it is not a standard rubric. We have higher expectations for the culminating experience in the ME MS program as compared to the BS ME program.
The Value Rubrics were developed for Baccalaureate Programs and as such was not appropriate for our expectations at the MS level. We are discussing how to more closely align with our BS ME written communication rubric so that we will be able to more easily compare the results of our assessment to our BS program. It is important that we develop modifications that allow for the more stringent standards expected from graduates of an MS ME program.
We will be mindful of the use of the Value Rubrics since other campus programs use them and consistency is useful for comparison purposes.	

IN QUESTIONS 2 THROUGH 5, REPORT IN DETAIL ON ONE PLO THAT YOU ASSESSED IN 2014-2015

Question 2: Standard of Performance for the selected PLO

Q 2.1. Specify one PLO here as an example to illustrate how you conducted assessment (be sure you checked the correct box for this PLO in Q1.1): Written Communication	**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. <u>Please provide the rubric(s)</u> and standard of performance that you have developed for this PLO here or in the appendix: **[Word limit: 300]**

Standard of performance is 80% of theses scored are at Acceptable level or above. See Appendices.

Q2.4. Please indicate the category in which the selected PLO falls into.

[ ]	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
[ ]	9. Team work
[ ]	10. Problem solving
[ ]	11. Civic knowledge and engagement
[ ]	12. Intercultural knowledge and competency
[ ]	13. Ethical reasoning
[ ]	14. Foundations and skills for lifelong learning
[ ]	15. Global learning
[ ]	16. Integrative and applied learning
[ ]	17. Overall competencies for GE Knowledge
[ ]	18. Overall competencies in the major/discipline
[ ]	19. Other:

Please indicate where you have published the PLO, the standard of performance, and the rubric that measures the PLO:	Q2.5	Q2.6	Q2.7
	(1) PLO	**(2) Standards of Performance**	**(3) Rubrics**
1. In **SOME** course syllabi/assignments in the program that address the PLO	X	X	X
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:			

Question 3: Data Collection Methods and Evaluation of Data Quality for the <u>Selected</u> PLO

Q3.1. Was assessment data/evidence **collected** for the selected PLO in 2014-2015?	**Q3.2. If** yes, was the data **scored/evaluated** for this PLO in 2014-2015?
X 1. Yes	X 1. Yes
☐ 2. No (Skip to **Q6**)	☐ 2. No (Skip to **Q6**)
☐ 3. Don't know (Skip to **Q6**)	☐ 3. Don't know (Skip to **Q6**)
☐ 4. N/A (Skip to **Q6**)	☐ 4. N/A (Skip to **Q6**)

Q3.1A. How many assessment tools/methods/measures **in total** did you use to assess this PLO? One. Thesis scoring	Q3.2A 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]** Completed MS theses were scored.

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

Q3.3. Were direct measures [key assignments, projects, portfolios, etc.] used to assess this PLO? [X] 1. Yes [ ] 2. No (Go to **Q3.7**) [ ] 3. Don't know (Go to **Q3.7**) Q3.3.2. Please attach the direct measure you used to collect data. MS Theses	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 [ ] 2. Key assignments from required classes in the program [ ] 3. Key assignments from elective classes [ ] 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 [ ] 8. Other measure. Specify:

Q3.4. How was the data evaluated? **[Select only one]**
[ ] 1. **No** rubric is used to interpret the evidence (Go to **Q3.5**)
[ ] 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. Specify:

Q3.4.1. 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	Q3.4.2. 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	Q3.4.3. Was the rubric 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? The entire full time tenure track faculty planned the assessment strategies and the entire faculty review the data and make recommendations to close the loop.	Q3.5.1. If the data was evaluated by multiple scorers, was there a norming process (a procedure to make sure everyone was scoring similarly)? [X] 1. Yes [ ] 2. No [ ] 3. Don't know

Q3.6. How did you **select** the sample of student work [papers, projects, portfolios, etc.]? Random	**Q3.6.1.** How did you **decide** how many samples of student work to review? We have been told that 4 to 5 is a good representative number

Q3.6.2. How many students were in the class or program? About 50 in the MS program at various stages. About 15 in the thesis writing component	**Q3.6.3.** How many samples of student work did you evaluate? 5	**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? [ ] 1. Yes [X] 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) [ ] 3. College/Department/program student surveys [ ] 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:
Q3.7.2 If surveys were used, how was the sample size decided?	
Q3.7.3. If surveys were used, briefly specify how you selected your sample.	**Q3.7.4. If** surveys were used, what was the response rate?

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? [ ] 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 **Q3.9**) [ ] 3. Don't know (Go to **Q3.9**)	**Q3.8.3.** If other measures were used, please specify:

Q3D: Alignment and Quality

Q3.9. Did the data, including the direct measures, from all the different assessment tools/measures/methods directly align with the PLO? [X] 1. Yes [ ] 2. No [ ] 3. Don't know	**Q3.9.1.** Were **ALL** the assessment tools/measures/methods that were used good measures for the PLO? [X] 1. Yes [ ] 2. No [ ] 3. Don't know

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]

Based on the evaluation using our Thesis Scoring Rubric of five randomly selected theses the majority of the students are able to communicate in written English at an acceptable level. Of particular importance to success in the program is the ability to communicate in a clear and complete manner in both written and spoken English. It is of note that the effectiveness of all the theses was considered "acceptable" or "strong" and the weakest area is in the grammar and mechanics. These are areas that we continue to focus on because a significant fraction of our MS ME students are from international backgrounds in which English is not their first language. We have added a GWI course as a requirement and students are advised to take that course in their first term in the program.

Criterion	2- Strong	1 - Acceptable	0 -Weak	Total (N = 5)
D.1 Effectiveness of Thesis	60%	40%		1.6
D.2 Focus of Thesis	53%	47%		1.5
D.3 Support	60%	40%		1.6
D. 4 Organization	67%	33%		1.7
D. 5 Style	47%	33%	20%	1.3
D. 6 Grammar & Mechanics	33%	47%	20%	1.3

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. In all areas 80% of theses meet the standard of 80% in the Strong or Acceptable category

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

	1. **Exceeded** expectation/standard
X	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

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

Q5.1. As a result of the **assessment effort in 2014-2015** 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)?

	1. Yes
X	2. No (Go to **Q6**)
	3. Don't know (Go to **Q6**)

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]**

No significant changes. Expand the availability of Rubric to other graduate courses.

Q5.2. How have the assessment data from last year (**2013 - 2014**) 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:

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

The ME faculty use the thesis scoring as an opportunity to ensure that all MS students are receiving consistent guidance and instruction in how to design, execute, and document a project.
We plan to survey MS alumni to see if the written requirement is useful in their careers and how the thesis component can be made more effective

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]**

Alumni and industry surveys

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

	1. Critical thinking
	2. Information literacy
	3. Written communication
X	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 and competency
	13. Ethical reasoning
	14. Foundations and skills for lifelong learning
	15. Global learning
	16. Integrative and applied learning
	17. Overall competencies for GE Knowledge
	18. Overall competencies in the major/discipline

19. Other, specify any PLOs that were assessed in 2014-2015 but
      not included above:
a.
b.
c.

Q8. Have you attached any appendices? If yes, please list them all here:

Appendix I – MS ME Graduate Learning Objectives
Appendix II – Thesis Scoring Rubric

Program Information

P1. Program/Concentration Name(s):

P2. Program Director:

MS in Mechanical Engineering **P1.1.** Report Authors: **Susan L. Holl and Kenneth Sprott**	Akihiko Kumagai **P2.1.** Department Chair: Susan L. Holl
P3. Academic unit: Department, Program, or College: Department of Mechanical Engineering	**P4.** College: Engineering and Computer Science

P5. Fall 2014 enrollment for Academic unit *(See Department Fact Book 2014 by the Office of Institutional Research for fall 2014 enrollment:* Fall 2013 (from Fall 2014 Factbook): 49 Fall 2014 (from SacVault enrolled majors): 62	**P6.** Program Type: **[Select only one]** ☐ 1. Undergraduate baccalaureate major ☐ 2. Credential ☒ 3. Master's degree ☐ 4. Doctorate (Ph.D./Ed.d) ☐ 5. Other. Please specify:

Undergraduate Degree Program(s): **P7.** Number of undergraduate degree programs the academic unit has: 1 **P7.1.** List all the name(s): BS in Mechanical Engineering **P7.2.** How many concentrations appear on the diploma for this undergraduate program? 0	*Master Degree Program(s):* **P8.** Number of Master's degree programs the academic unit has: 1 **P8.1.** List all the name(s): MS in Mechanical Engineering **P8.2.** How many concentrations appear on the diploma for this master program? 0
Credential Program(s): **P9.** Number of credential programs the academic unit has: 0 **P9.1.** List all the names:	*Doctorate Program(s)* **P10.** Number of doctorate degree programs the academic unit has: 0 **P10.1.** List all the name(s):

When was your assessment plan?	1. Before 2007-08	2. 2007-08	3. 2008-09	4. 2009-10	5. 2010-11	6. 2011-12	7. 2012-13	8. 2013-14	9. 2014-15	10. No formal plan
P11. Developed	X									
P12. Last updated							X			

	1. Yes	2. No	3. Don't Know
P13. Have you developed a curriculum map for this program?		X	
P14. Has the program indicated explicitly where the assessment **of student learning** occurs in the curriculum?		X	
P15. Does the program have any capstone class?	X		
P16. Does the program have **ANY** capstone project?	X		

Appendix I: MS MECHANICAL ENGINEERING GRADUATE LEARNING OBJECTIVES

Objective	Outcome (Assessment Components)
A. Technical and Professional Maturity: Will enter professional employment at an advanced level and/or Ph.D. programs in the following areas of mechanical engineering practice: machine design, thermal and fluids systems, and manufacturing.	Demonstrate proficiencies in technical materials which are up-to-date and high in demand especially in the concentration area.
B. Knowledge and Analysis: Will use knowledge of the principles of science, mathematics, and engineering, to identify, formulate, and solve problems in mechanical engineering.	Identify and formulate technical requirements. Use mathematical and scientific tools to analyze, test, solve problems, and improve performance of designs.
C. Creativity: Will apply creativity in the design of systems, components, or processes to meet desired needs.	Identify needs or system improvements in a real world environment. Operationalize these needs and system improvements into specific technical requirements. Based on the technical requirements, perform engineering synthesis, design and analysis to develop products and/or solve problems.
D. Communication: Will communicate effectively through speaking, writing, and graphics.	Write technical reports with specifying clear contributions, explanations, and conclusions. Publish reports (including thesis) following a standard professional format. Present technical work for a targeted audience with effective oral communication and visual aids.

Appendix II: **Thesis Scoring Rubric**

Assessment Rubric for Thesis	Strong 2	Acceptable 1	Weak 0
EFFECTIVENESS OF THE THESIS: Papers written in an academic context are expected to contain a thoughtful and insightful thesis, main idea, position, or claim that is sustained throughout the paper.	The thesis is clear, insightful and thought-provoking. It is sustained consistently throughout the paper.	The thesis is clear and plausible. It is sustained consistently throughout the paper.	The thesis is weak or absent. It is not sustained throughout the paper.
FOCUS OF THESIS: Papers written in an academic context are expected to address the topic and issues set forth in the assignment and address all aspects of the writing task. Usually requires some discussion and refutation of an opposing view point.	The paper responds to the assignment and addresses the topic and issues. Discussion of a counterargument is included when appropriate.	The paper responds to the assignment and addresses the topic and issues. Some discussion of a counter-argument is included when appropriate.	The paper does not respond to the assignment or treats the assignment in a superficial, simplistic, or disjointed manner. Little or no discussion of a counter-argument in included.
SUPPORT: Papers written in an academic context are expected to provide support for main points with reasons, explanations, and examples that are appropriate for intended audience.	The thesis is fully and convincingly developed, supported with good reasons, explanations and examples.	The thesis is adequately developed, supported with reasons, explanations, and examples.	The thesis is inadequately developed, unsupported with reasons, explanations, and examples.
ORGANIZATION: Papers written in an academic context are expected to be well-organized, in both overall structure & paragraphs.	The paper is well-structured; its form contributes to its purpose. Paragraphs are well-organized and carefully linked to the thesis.	The paper is generally well structured, with only a few flaws in overall organization. Paragraphs are adequately organized and generally linked to the thesis.	The paper is poorly structured; organizational flaws undermine its effectiveness. Paragraphs are not well organized; nor are they linked to the thesis.
STYLE: Papers written in an academic context are expected to be stylistically effective – that is, to contain well-structured sentences, well-chosen words, and an appropriate tone, as a means of achieving its purpose.	The sentence structure, word choice, fluency, and tone of the paper enhance its effectiveness and reinforce its purpose.	The sentence structure, word choice, fluency, and tone of the paper contribute to its effectiveness and adequately support its purpose.	The sentence structure, word choice, fluency, and tone of the paper detract from its effectiveness or are inappropriate to its purpose.
GRAMMAR AND MECHANICS: Papers written in an academic context are expected to maintain sentence level correctness in terms of syntax, grammar, spelling, punctuation, and format.	The paper is correct in terms of its syntax, grammar, spelling, punctuation, and format.	Sentence level errors do not seriously detract from the paper's effectiveness.	Sentence level errors are so frequent and disruptive that they detract from the paper's effectiveness.