

2017 - 2018 Annual Program Assessment Report

The Office of Academic Program Assessment
California State University, Sacramento

For more information visit our [website](#)
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 Mechanical Engineering

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**:

The specific PLO we assessed in 2017-18 were closely aligned with the University "Written communication" and "Teamwork" and are specifically:

An ability to communicate effectively.

An ability to function on multidisciplinary teams.

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:

Although there is no rubric for writing itself, there is an instruction for what items to be reported for each

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):

Written Communication

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.

The specific PLO we assessed in 2017-18 were closely aligned with the University "Written communication" and "Teamwork" and are specifically: *An ability to communicate effectively.*

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 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:

We focused on ME 191 Senior Project course as this is the cumulative experience course students usually take at the last semester before graduation. As for the standards of performance/expectations, we aim all students complete their projects with all reports including all items required as described on the attached report instruction and the course syllabus.



ME191 MFG Test Plan & Final Report.pdf
188.1 KB



ME191 Syllabus Spring 2018.pdf
402.63 KB

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:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. In SOME course syllabi/assignments in the program that address the PLO

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. In ALL course syllabi/assignments in the program that address the PLO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. In the student handbook/advising handbook
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. In the university catalogue
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. On the academic unit website or in newsletters
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6. In the assessment or program review reports, plans, resources, or activities
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. In new course proposal forms in the department/college/university
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8. In the department/college/university's strategic plans and other planning documents
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. In the department/college/university's budget plans and other resource allocation documents
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. Other, specify: <input type="text"/>

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?

Don't know

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:

ME 191 Senior Project

1. Initial Manufacturing Document
2. Five design reviews
3. Final Drawing/Documentation Package

(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:

See Q2.3.

 No file attached

 No file attached

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?

Q3.5.1.

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

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.)?

All 25 ME 191 Senior Project reports from Spring 2018 were considered.

Q3.6.1.

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

See Q3.6.

Q3.6.2.

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

Q3.6.3.

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

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:

More than a half of senior projects were sponsored by local companies and organizations. For each sponsored project, the group and the instructor closely communicated with the corresponding sponsor to report progresses and adjust the course of the project to meet their needs as well as the course expectations.

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:

Question 3C: 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
- 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:

 No file attached

 No file attached


(Remember: Save your progress)


Question 4: Data, Findings, and Conclusions

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](#)):

Other than the final grades of the projects, no such table/graph was used. In future, we would certainly consider developing the table like the one shown by the example.

 No file attached

 No file attached

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?

The report writing portion of the course grades indicates that all 25 teams well accomplished the standards of reports described on report instructions and the course syllabus.

 No file attached

 No file attached

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.

We certainly realize that it is important to develop a rubric table such as an example presented in Q4.1 to assess writing communication. We will develop such a rubric considering both Sac State annual assessment as well as ABET. We strongly hope to use such a rubric to truly assess writing communication skills and find ways for continuous improvements.

Q5.1.2.

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

- 1. Yes, describe your plan:

- 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	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Modifying curriculum	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Improving advising and mentoring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
4. Revising learning outcomes/goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
5. Revising rubrics and/or expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
6. Developing/updating assessment plan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
7. Annual assessment reports	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Program review	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
9. Prospective student and family information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
10. Alumni communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
11. WSCUC accreditation (regional accreditation)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Program accreditation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
13. External accountability reporting requirement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
14. Trustee/Governing Board deliberations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
15. Strategic planning	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Institutional benchmarking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
17. Academic policy development or modifications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
18. Institutional improvement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
19. Resource allocation and budgeting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
20. New faculty hiring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
21. Professional development for faculty and staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
22. Recruitment of new students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
23. Other, specify: <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Q5.2.1.

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

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	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Standards of Performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
3. Measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
4. Rubrics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
5. Alignment	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Data Collection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
7. Data Analysis and Presentation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
8. Use of Assessment Data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
9. Other, please specify: <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

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:

(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:

No file attached

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?

Q9. Please attach any additional files here:

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 Mechanical Engineering

Q11.

Report Author(s):

Akihiko Kumagai

Q11.1.

Department Chair/Program Director:

Akihiko Kumagai

Q11.2.

Assessment Coordinator:

Q12.

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

Mechanical Eng.

Q13.

College:

College of Engineering and Computer Science

Q14.

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

961 as of Fall 2016

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?

Q16.1. List all the names:

BS in Mechanical Engineering

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

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

Q17.1. List all the names:

MS in Mechanical Engineering

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

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

Q18.1. List all the names:

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

Q19.1. List all the names:

When was your Assessment Plan...	1.	2.	3.	4.	5.	6.	7.	8.
	Before 2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	No Plan	Don't know
Q20. Developed?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q20.1. Last updated?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20.2. (Required)

Please **obtain** and **attach** your latest **assessment plan**:



Assessment Procedures.docx
15.6 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**:



curriculum roadmap.pdf
132.85 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:

ME 190/ME 191 two -semester senior project courses

- 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

ME 191: Project Engineering II (Senior Project)

Spring 2018
Mechanical Engineering Department



MANUFACTURING TESTING/ANALYSIS AND FINAL REPORT

TEST PLAN (DUE APRIL 26 OR WHEN THE SYSTEM IS COMPLETED):

The purpose of testing is to verify that the assembly or system is developed according to the specifications and constraints determined from the initial design phase and throughout the duration of the manufacturing process. A test plan outlines the criteria and guidelines for the testing process such as approach, tasks, resource requirements, schedule, and other constraints.

Basic Requirements:

- Refine/update initial design constraints from ME 190
- Address additional design constraints since the start of ME 191
- Identify the features of the system or assembly to identify testing scope
- Determine allowable tolerance for testing results
- Create a procedure to test each individual specification

There will be a table with the following content included:

- Identify which features are not tested
- Identify quantitative and qualitative constraints with tolerances
- Determine estimated completion date or priority
- Specify person(s) assigned
- Specify additional testing equipment needed
- Specify facilities requirements
- Identify anticipated mechanical, electrical, or chemical risks

Test results:

If your test results do not satisfy your expected values, you have two options

1. Verify your test setup and equipment carefully and redo test
2. Adjust the specifications to match your tested results

FINAL REPORT (DRAFT DUE MAY 7 AND FINAL DRAFT MAY 21):

Your report will summarize the activities of 191 exclusively.

- Brief background or introduction (Executive Summary) – No more than 1 page single-spaced
- Clearly illustrate the systems functions and constraints
 - This includes the complete list of specifications
- Testing results
 - This will include the test plan
- Describe all major design changes as a result of the assembly, manufacturing, or testing processes
- Describe a simple plan for a Beta release redesign (Conclusion)
 - If someone wanted to take this project to the next phase, what would that entail?
- Appendix
 - Nomenclature
 - Formulas
 - Fully updated BOM
 - Complete drawing package will be kept as separate document

ME 191: Project Engineering II (Senior Project)

Spring 2018 - Class # 32269, 32616
Mechanical Engineering Department



Instructor: Michael Bell
Office: SCL 1329 (Student Machine Shop)
Office Hours: Any lab session
Contact: mmb43@csus.edu

Other Lab Instructor: Kevin Carter; kevincarter@csus.edu

Machine Shop Tech: Michael Newton; newtonm@csus.edu

CATALOG DESCRIPTION:

Continuation of the project begun in ME 190. Part II consists of fabrication and assembly of equipment, testing and evaluation, and reporting. Seminar one hour; laboratory three hours. 2 Units.

PREREQUISITE:

ME 190

OBJECTIVES:

By the end of semester, the students will be able to:

- 1) Manufacture and test a project from ME 190 with the same scope and complexity within the stated time and budgetary constraints.
- 2) Transform a general project concept into an actual prototype satisfying constraints, and objectives.
- 3) Use a systematic process to test, analyze and evaluate theoretical calculations and design concepts with experimental data.
- 4) Clearly justify and document engineering change decisions.
- 5) Present technical details of final design modifications with drawings, a report and a presentation.
- 6) Projects are deemed successful if comparison of experimental data with expected calculated theoretical data is technically justified.

CANVAS:

Resources and announcements are posted on Canvas, an online learning management system. Canvas is also used to communicate with your group.

TEACHING PHILOSOPHY:

The emphasis for this course is to make sure the student learns the process of product development; more specifically, the process of first article release (Alpha). Each student will demonstrate how to apply engineering principles to a concept and test the outcome against expected results.

ADDITIONAL SUPPORT:

If your project requires additional feedback or support, feel free talk with professors from other departments or off-campus experts.

GRADING AND IMPORTANT DATES:

Initial Manufacturing Documents	10%	Feb 5
Hazard Form (1 per team)	2%	Feb 5
Design Reviews #1 (group 1)	4%	Feb 5
Design Reviews #1 (group 2)	4%	Feb 12
Design Reviews #2 (group 1)	4%	Feb 19
Design Reviews #2 (group 2)	4%	Feb 26
Design Reviews #3 (group 1)	4%	Mar 5
Design Reviews #3 (group 2)	4%	Mar 12
Regular Seminar Session	---	Mar 26
Design Reviews #4 (group 1)	4%	Apr 2
Design Reviews #4 (group 2)	4%	Apr 9
Design Reviews #5 (group 1)	4%	Apr 16
Design Reviews #5 (group 2)	4%	Apr 23
Manufacturing/Assembly Completed	28%	Apr 26
Design Reviews #6 (Open to all)	Optional	Apr 30, May 7
Analysis/Testing Completed	25%	May 10
Senior Design Showcase (Presentation)	5%	May 11
Final Drawing/Documentation Package	10%	May 21

SHOP SAFETY EXPECTATIONS:

Each student using the student machine shop is expected to follow all shop safety rules, which will be reviewed during the lab session. The lab instructor has full autonomy and discretion to not allow a student to use the equipment if he/she is incapable of following the shop safety rules.

Any student that wants to use a product not already on campus, a material safety data sheet (MSDS) will be required to submit. MSDSs are typically found through the manufacturer of the product. This includes, but not limited to, paint, resin, thinner, etc. In addition, appropriate personal protection equipment (PPE) will be required when utilizing these products to minimize hazards while doing work on campus.

SHOP USE PROCEDURE:

Every student that wants to use the machine shop will need to:

1. Get a drawing of the part signed off by any instructor
2. Check in with the lab instructor for tooling
3. Perform manufacturing process
4. Clean every machine or equipment used (not just the last one)
5. Indicate vises if applicable and make sure machine tooling is put back in the proper location
6. Return tool crib tooling to the lab instructor
7. Check out with the lab instructor

WORK OFF CAMPUS:

Conducting machining, fabrication, and assembly work off campus is allowed.

GROUP BINDER:

Every group will have a binder in the shop which will be used during design reviews and effectively communicating with the lab instructor. The contents will include:

- Full BOM
 - Item ID
 - Part number
 - Part revision
 - Quantity
 - Identify subassemblies (if applicable)
 - Manufacturing process for all custom parts
 - Vendor information for purchased parts
 - Pricing and lead times for purchased parts
 - Date received/complete
- Assembly drawings
- Individual part drawings
 - Proper template
 - Part number and rev
 - No missing dimensions or callouts
 - Verify tolerances
 - Starting stock
 - Material and Finish
 - Quantity
- Hazard Form
- Safety Forms (Each Team Member)

WORK ORDERS:

For advance operations like CNC machined parts, CNC plasma cutting, 3D printing, and TIG welding aluminum or stainless steel, machine shop technicians are available to assist you with the manufacturing processes. The following is the proper procedure:

1. Submit work order via the ECS Tech Shop website:
https://www.ecs.csus.edu/webApps/eee_app/online_form.php
 - a. For CNC parts, be sure to include a SW part file and PDF drawing
2. Make note of the work order number
3. Email the shop technician (Mike Newton, newtonm@csus.edu) when a submission is made (copy Mike Bell on this email)
4. Write WO# on part drawing
5. Consult with the shop technician before preparing stock material
6. Place stock material with WO# written on it and part drawing with instructor signatures and WO# on the table next to Newton's office (SCL 1329 A)

The deadline to submit a work order is April 27.

OPEN LAB SCHEDULE:

The following table shows all available lab sessions for ME 191. Each student can go to any ME 191 lab session. The department will send out a notice if any lab instructor needs to cancel labs during the semester.

	Monday	Tuesday	Wednesday	Thursday	Friday
9:00					
10:00					
11:00					
12:00	Carter		Bell		
13:00					
14:00					
15:00	Bell		Bell		
16:00					
16:30					
17:00	Bell		Bell		
18:00					
19:00					
19:30					
20:00					
21:00					
22:00					

LOCKERS:

Lockers for storing project components or equipment are available throughout the semester. Clearly label the locker with “ME 191” and your team name. The lockers must be emptied at the end of the semester.

GROUP DYNAMICS:

Each student is required to participate in the manufacturing and testing of the project. If a team member is not contributing to the project to a satisfactory level, the total grade will reflect that. Conflict and disagreements are part of any group project. Nonetheless, each team is responsible for dealing with internal conflict as soon as it begins. In the event that the group can no longer work together, the group will be referred to the Office of Student Conduct.

ACADEMIC HONEST POLICY:

Students are expected to adhere to the University Policy on maintaining intellectual integrity. Refer to the policy link for full details: <http://csus.edu/umannual/student/stu-0100.htm>

Assessment Procedures used for ME Learning Outcomes

Assessment Procedure	ME Learning Outcome										
	a	b	c	d	e	f	g	h	i	j	k
Course Assessment	x	x	x	x	x	x	x	x	x	x	x
Graduating Senior Survey	x	x	x	x	x	x	x	x	x	x	x
Alumni Survey	x	x	x	x	x	x	x	x	x	x	x
Writing/Documentation Review			x				x				x
Pass Rate on FE Exam	x				x						
Targeted Surveys	x	x	x	x	x	x	x	x	x	x	x
Senior Project Presentation Evaluation	x	x	x		x		x				
Employer Surveys	x	x	x	x	x	x	x			x	x
Interview with Employers						x	x	x		x	

Assessment Plan

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 ABET
Curriculum Outcomes Assessment	X	X	X	X	X	X	X	X
Graduating Senior Survey	X	X	X	X	X	X	X	X
Alumni Survey	X	X			X		X	
Writing/Documentation Review	X	X	X	X	X	X	X	X
Senior Project Presentations	X	X	X	X	X	X	X	X
Pass Rate on FE	X	X	X	X	X	X	X	X
Targeted Surveys		X			X			X
Employer Surveys		X			X			X
Interviews with Employers	X	X	X	X	X	X	X	X
Evaluate Assessment Data and Processes			X	X	X	X	X	X
Take Action for Improvement			X	X	X	X	X	X

M.E. PROGRAM

CALIFORNIA STATE UNIVERSITY, SACRAMENTO
COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

Total Units: 122

Freshman Year		Sophomore Year		Junior Year		Senior Year	
1st Semester 14 Units	2nd Semester 14 Units	1st Semester 17 Units	2nd Semester 15 Units	1st Semester 16 Units	2nd Semester 17 Units	1st Semester 15 Units	2nd Semester 14 Units
1	2	3	4	5	6	7	8
A CHEM 1E (4) A1	PHYS 11A (4) A2 C1, C2	PHYS 11C (4) A3 A2, C2	ENGR 17 (3) A4 A3, C4 or A3, C4	ENGR 110 (3) A5 B4, C3, C4	ENGR 132 (3) A6 A5	ME 126 (3) A7 A6, F5	ME ELECTIVES 6 UNITS
B ENGR 6 (3) B1	ME 37 (3) B2	ENGR 45 (3) B3 A1, C1	ENGR 30 (3) B4 A2, C2	ENGR 112 (3) B5 B1, B3, B4, C4	ME 138 (3) B6 B2, C5	ME 128 (3) B7 F5	
C MATH 30 (4) C1	MATH 31 (4) C2 C1	MATH 32 (4) C3 C2	MATH 45 (3) C4 C2	ME 116 (2) C5 B1, B2, B5	ME 117 (2) C6 C5	ME 190 (3) C7 C6	ME 191 (2) C8 C7
D GEN ED (3)	GEN ED (3)	GEN ED (3)	GEN ED (3)	ME 105 (3) D5 A4, B4	ME 171 (3) D6 A5, D5	ME 172 (3) D7 D6	GEN ED (3)
E		GEN ED (3)	GEN ED (3)	ME 108 (2) E5 C2	ME 180 (3) E6 B3, B5	GEN ED (3)	GEN ED (3)
				ENGR 124 (3) F5 A1, A2, C3	GEN ED (3)		

The course sequence shown insures all prerequisites are completed prior to taking a course.
Prerequisites are listed in **red**; concurrent enrollment listed in **green**.
Please see reverse side for course titles.

If you have any questions or concerns, please contact us at:
(916)278-7081 or
me-department@ecs.csus.edu

Mechanical Engineering Course Titles

Course	Course Title
CHEM 1E	General Chemistry for Engineers
PHYS 11A	General Physics: Mechanics
PHYS 11C	General Physics: Electricity and Magnetism
MATH 30	Calculus I
MATH 31	Calculus II
MATH 32	Calculus III
MATH 45	Differential Equations
ENGR 6	Engineering Graphics and CADD
ENGR 17	Circuit Analysis
ENGR 30	Analytic Mechanics: Statics
ENGR 45	Engineering Materials
ENGR 110	Analytic Mechanics: Dynamics
ENGR 112	Mechanics of Materials
ENGR 124	Thermodynamics
ENGR 132	Fluid Mechanics
ME 37	Manufacturing Processes
ME 105	Introduction to Technical Problem Solving
ME 108	Professional Topics in Mechanical Engineering
ME 116	Machinery Design I
ME 117	Machinery Design II
ME 126	Heat Transfer
ME 128	Thermal-Fluid Systems
ME 138	Concurrent Product and Process Design
ME 171	Modeling & Simulation of Mechatronics & Control Systems
ME 172	Control System Design
ME 180	Mechanical Properties of Materials
ME 190	Project Engineering I
ME 191	Project Engineering II

Mechanical Engineering Electives*

Course	Course Title
ME 114	Vibrations
ME 115	Dynamics of Machinery and Multi-Body Systems
ME 121	Solar Thermal & Energy Storage Systems
ME 122	Geo-Thermal & Bio-Energy Systems
ME 123	Wind, Hydro and Ocean Energy
ME 136	Numerical Control Programming
ME 137	Product Design for Manufacturing & Automation
ME 140	Introduction to Motors and Actuators
ME 141	Introduction to Tolerance Analysis
ME 143	Vehicle Dynamics & Design
ME 152	Turbomachinery Design
ME 153	Thermodynamics of Combustion Engines
ME 155	Gas Dynamics
ME 156	Heating and Air Conditioning Systems
ME 159	High Efficiency HVAC
ME 164	Introduction to Test Automation
ME 165	Introduction to Robotics
ME 173	Application of Finite Element Analysis
ME 176	Product Design and Pro/Engineer
ME 177	3-D Parametric Modeling
ME 182	Introduction to Composite Materials
ME 184	Corrosion and Wear
ME 186	Fracture Mechanics in Engineering Design
ME 196A	Motion & Dynamic Analysis of Solid Modeling
ME 196B	Engineering System Approach to Product Design
ME 196C	Computer Programming for Mechanical Engineering Application
ME 196D	Ground Vehicle Aerodynamics
ME 196E	Vehicle Crash Reconstruction
ME 196F	Materials Selection for Engineering Design

*See Department Chair for other approved electives