
Please submit your report to your department chair or program coordinator, the Associate Dean and Dean of your College, and to james.solomon@csun.edu, Director of the Office of Academic Assessment and Program Review, by September 30, 2020. You may, but are not required to, submit a separate report for each program, including graduate degree programs, which conducted assessment activities, or you may combine programs in a single report. Please include this form with your report in the same file and identify your department/program in the file name. Please do not change the date on the form, and be sure to check that your report is ADA accessible.

College: Engineering and Computer Science

Department: Mechanical Engineering

Program: BSME

Assessment liaison: Aram G. Khachatourians

1. Please check off whichever is applicable:
   A. ________ Measured student work within program major/options.
   B. ________ Analyzed results of measurement within program major/options.
   C. ___X___ Applied results of analysis to program review/curriculum/review/revision major/options.
   D. _________ Participated in the 2019-20 assessment of General Education Section D: Social Sciences and U.S. History and Government student learning outcomes

2. Overview of Annual Assessment Project(s). On a separate sheet, provide a brief overview of this year’s assessment activities, including:
   • an explanation for why your department chose the assessment activities (measurement, analysis, application, or GE assessment) that it enacted
   • if your department implemented assessment option A, identify which program SLOs were assessed (please identify the SLOs in full), in which classes and/or contexts, what assessment instruments were used and the methodology employed, the resulting scores, and the relation between this year’s measure of student work and that of past years: (include as an appendix any and all relevant materials that you wish to include)
   • if your department implemented assessment option B, identify what conclusions were drawn from the analysis of measured results, what changes to the program were planned in response, and the relation between this year’s analyses and past and future assessment activities
   • if your department implemented option C, identify the program modifications that were adopted, and the relation between program modifications and past and future assessment activities
   • if your program implemented option D, exclusively or simultaneously with options A, B, and/or C, identify the GE learning outcomes assessed, the assessment instruments and methodology employed, and the resulting scores
   • in what way(s) your assessment activities may reflect the university’s commitment to diversity in all its dimensions but especially with respect to underrepresented groups
   • any other assessment-related information you wish to include: e.g. SLO revision (especially to ensure continuing alignment between program course offerings and both program and university student learning outcomes) and the creation or modification of new assessment instruments
After a very successful visit by the Accreditation Board for Engineering and Technology (ABET) in fall 2019 semester that resulted in a full accredited program for six years without any deficiencies, the Mechanical Engineering department has spent the spring 2020 and fall 2020 semesters in incorporating the lessons learned from the last review cycle to better plan the efforts for the 2025 accreditation cycle. Items shown below are a partial list of the new approach and accomplishments:

I. Developed a very detailed task list with specific, meaningful, and measurable deliverables/goals to guide the process.

II. Generated a comprehensive list of tools that the department will develop and use in the assessment process. Table 1 shown below is a partial list of tools T1 – T14 agreed by all faculty in the department.

<table>
<thead>
<tr>
<th>No.</th>
<th>Tool</th>
<th>Notes and Comments</th>
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<tbody>
<tr>
<td>T1</td>
<td>ABET Quizzes</td>
<td>This approach proved to be good in the previous cycle; however, we need to revisit the questions and point system. We also learned that not every outcome is capable of being evaluated using these quizzes. We should also improve on the participation # and educate all FT/PT Faculty on the purpose, etc.</td>
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<tr>
<td>T2</td>
<td>Oral presentations in lecture classes</td>
<td>This would be a good approach to evaluate teamwork, communications, and presentation skills at different levels. Classes that come to my mind are: ME186, 286, 380, 386, etc. This could be done by the faculty teaching the class, or peer faculty who are invited. Rubric should evaluate the ABET outcomes and the assessment should be documented for ABET report.</td>
</tr>
<tr>
<td>T3</td>
<td>Written reports in lecture classes</td>
<td>Similar to item #2 above, but with different rubric. Rubric should evaluate the ABET outcomes and the assessment should be documented for the ABET report.</td>
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<tr>
<td>T4</td>
<td>PDR/CDR presentations for all senior design projects</td>
<td>This would be for all ME485A/B sections, with different set of rubrics than item #2 above, and we can even have evaluators be industry reviewers. Also, Senior Design Show Case judges evaluations of the oral and static presentations may be used to supplement data.</td>
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<tr>
<td>T5</td>
<td>Written semester reports by all senior design projects</td>
<td>Some of the projects prepare a semester report, and others do one report in Spring. Perhaps we can standardize the process, and prepare an outline of topics that should be included regardless of the project, along with rubrics. We could do a peer review, or have industry reviewers.</td>
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Table 1: A partial list of tools that will be used by the ME department in the 2025 accreditation cycle
III. Produced a table that not only maps outcomes 1 thru 7 provided by ABET to our core courses, but also specifically shows the tool(s) that will be used for each class to measure student achievement. See Table 2.

![Table 2: Partial list of courses in the department mapped to outcomes 1 thru 7, along with specific assessment tools](image-url)

Table 2: Partial list of courses in the department mapped to outcomes 1 thru 7, along with specific assessment tools
3. **Preview of planned assessment activities for 2020-21.** Include a brief description as reflective of a continuous program of ongoing assessment.

   The Mechanical Engineering department continues its assessment efforts, by working towards finalizing and clearly defining specifics for each tool, and educating all full time and part time faculty, therefore being able to potentially start the data collection process as early as the spring 2021 semester.

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**College:** Engineering and Computer Science  
**Department:** Mechanical Engineering  
**Program:** MSME  
**Assessment liaison:** Abhijit Mukherjee

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2. **Overview of Annual Assessment Project(s).** On a separate sheet, provide a brief overview of this year’s assessment activities, including:  
   - an explanation for why your department chose the assessment activities (measurement, analysis, application, or GE assessment) that it enacted  
   - if your department implemented assessment **option A**, identify which program SLOs were assessed (please identify the SLOs in full), in which classes and/or contexts, what assessment instruments were used and the methodology employed, the resulting scores, and the relation between this year’s measure of student work and that of past years: (include as an appendix any and all relevant materials that you wish to include)  
   - if your department implemented assessment **option B**, identify what conclusions were drawn from the analysis of measured results, what changes to the program were planned in response, and the relation between this year’s analyses and past and future assessment activities  
   - if your department implemented **option C**, identify the program modifications that were adopted, and the relation between program modifications and past and future assessment activities  
   - if your program implemented **option D**, exclusively or simultaneously with **options A, B, and/or C**, identify the GE learning outcomes assessed, the assessment instruments and methodology employed, and the resulting scores  
   - in what way(s) your assessment activities may reflect the university’s commitment to diversity in all its dimensions but especially with respect to underrepresented groups
any other assessment-related information you wish to include: e.g. SLO revision (especially to ensure continuing alignment between program course offerings and both program and university student learning outcomes) and the creation or modification of new assessment instruments.

The Master of Science in Mechanical Engineering (MSME) program was reviewed in 2018 via a self-study report, and a MOU was developed as a result. The current program Student Learning Outcomes (SLOs) for the MSME program are listed below.

i. Understand and apply advanced engineering mathematics, particularly to problems requiring matrix analysis and solutions of differential equations.

ii. Apply modern computational tools to attain solutions of complex mechanical engineering problems in one of the four emphasis areas listed below.

iii. Demonstrate achievement of specific learning outcomes in at least one of the following areas selected by the student: (1) Mechanical Systems Design, (2) System Dynamics and Controls, (3) Thermal-fluid Systems.

Overall assessment of the graduate program was based on a set of selected measures to determine how well the overall program outcomes and objectives are being achieved. These must be closely linked to plans for improving the program. For the graduate program, the Department has used the following items for assessment and improvement.

1. Consultation with the Department’s Industry Liaison Council with regard to overall department educational programs, the needs of current and future graduates, the strengths and weaknesses identified in those graduates, and the proper role of the Department in mechanical engineering education in the region.

2. Consultation between groups of faculty representing the emphasis areas in the MS program and industry experts (some from the Department’s Industry Liaison Council) to discuss specific program goals for each area.

To date our approach has focused on modifications to the admissions criteria and program elements that directly impact student success. Programmatic changes have been incorporated to improve student success as measured by retention and completion of the program and they are listed in the next paragraph. Other changes include higher admission standards and customized culminating experience options for each student.

The MSME program has gone through substantial changes in the last 2 years in order to bring the program in compliance with the EO 1071 requirements. The principal changes were implemented for the 2019-2020 academic year, and more streamlining of the program was carried out for the 2020-2021 academic year. The key modifications to the program include: (a) both the thesis and
comprehensive tracks now require 31 units as opposed to 30 and 33 units previously; (b) a core of 15 units of coursework covering the 3 major areas of the program is required for both the thesis and comprehensive tracks; and (c) a 1-unit culminating experience is now required for the completion of the degree. The 1-unit culminating experience covers either the comprehensive exam or the thesis defense. Most recently, the 4 emphasis areas were paired down to 3 areas of Mechanical Systems design, System Dynamics and Controls, and Thermal-Fluid Systems to more accurately reflect the program offering.

3. **Preview of planned assessment activities for 2020-21.** Include a brief description as reflective of a continuous program of ongoing assessment.

The MSME program Student Learning Outcomes (SLOs) were developed some time ago and were specific to the requirements in place prior to the modifications of the last two years. The plan for this academic year is to have the faculty associated with each of the three emphasis areas in the department review and assess whether the SLOs are still applicable or they need to be changed to better reflect the revised program requirements. The plan would be conducted in two steps: (i) assess the general SLOs first and then the SLOs for each emphasis area that are in place currently and modify any of the SLOs that do not correlate with the recent program offerings and requirements, and (ii) create means of assessing both the general and emphasis area-specific SLOs. The second step requires developing assessment tools to measure the achievement of SLOs by our graduating MSME students. This is the goal for the 2020-2021 academic year.