Program-Level Assessment: Annual Report

Program Name (no acronyms): Mechanical Engineering	Department: School of Engineering
Degree or Certificate Level: Bachelor of Science	College/School: Parks College
Date (Month/Year): 10/21	Assessment Contact: Mark McQuilling
In what year was the data upon which this report is based collected? AY 2019-2021	
In what year was the program's assessment plan most recently reviewed/updated? AY 2019	

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle? (Please list the full, complete learning outcome statements and not just numbers, e.g., Outcomes 1 and 2.)

In this two-year assessment cycle, all three program outcomes were assessed:
Program Outcome 1 (PO1): To practice the principles of engineering in mechanical or allied organizations
Program Outcome 2 (PO2): To pursue further learning in mechanical engineering or in allied disciplines
Program Outcome 3 (PO3): To function as effective engineers with professional knowledge, skills and values

The above three program outcomes are directly mapped to three of seven criteria from our Accreditation Board for Engineering and Technology (ABET) criteria as identified in our HLC assessment plan. These are:
PO1 > ABET Criterion 1 (AC1): An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
PO2 > ABET Criterion 4 (AC4): An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
PO3 > ABET Criterion 7 (AC7): An ability to acquire and apply new knowledge as needed, using appropriate learning strategies
During the September and October months of 2021 program faculty evaluated every ABET criterion according to the newly-created ABET assessment plan of spring 2019 in order to begin the new assessment process on good standing (covid-19 issues delayed the initial round of assessment until fall 2021). Future ABET assessments will review 1-2 ABET outcomes per year.

Our ABET assessment plan includes evaluating three courses for each ABET Criterion, intended to assess early, middle, and late stages of student development. These are:
AC1: ESCI 2100 Statics (early), MENG 2300 Applied Thermodynamics (middle), and MENG 3510 Material Science
AC4: MENG 1001 Intro to Engineering (early), MENG 2000 Foundations to Engineering Design (middle), and MENG 4014 Design II (late)
AC7: ESCI 2300 Thermodynamics (early), AENG 3100 Computer-Aided Engineering (middle), and MENG 4004 Design I (late)

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please describe and identify the course(s) in which these artifacts were collected. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

The artifacts collected include project reports, design reports, homeworks and exams. The artifacts were collected from the following courses:

ESCI 2100 (early), MENG 2300 (middle), MENG 3510 (late) MENG 1001 (early), MENG 2000 (middle), MENG 4014 (late) ESCI 2300 (early), AENG 3100 (middle), MENG 4004 (late) Madrid courses are not included in this assessment and no courses were offered at any other off-campus location.

3. Assessmenr4(0Tj/TT3 1Tf0 1Tfh/TT3 0(4/TT8 (r0 1Tf0 E)4 yv)TjETj/TT3 1Tc 0 1(en)8 n)8 n1

What have you learned from these results? What does the data tell you?

The outcomes assessment from various courses across the curriculum indicates the students are achieving the

C. What were the findings of the assessment?

See above.

D. How do you plan to (continue to) use this information moving forward?

Continue to develop the performance indicators and scoring rubrics to streamline the assessment process and methods. Put emphasis on the performance indicators and scoring rubrics to assess the outcomes achievement for more consistency across courses and outcomes.

IMPORTANT: Please submit any assessment tools (e.g., rubrics) with this report as separate attachments or copied and pasted into this Word document. Please do not just refer to the assessment plan; the report should serve as a stand-alone document.

OUTCOME ASSESSMENT TEMPLATE

Learning Outcome: 1 (Solve Problems using SEM) 2 (Design in Global Context) 3 (Effective Communication)

[select 1] 4 (Ethics in Global Context) 5 (Functional Teamwork) **6 (Experiment and Draw Conclusions)**

7 (Lifelong Learning)

Course: ESCI 3201 (Fluids Lab)

Location in Program: Early **Middle** End

Method: Formal Lab Report

Rubric: Lab reports are graded on: grammar and syntax; proper source citation; introduction; design of test; procedure; test results; discussion of results; conclusions; sample calculations; data reduction; tables and figures (see rubric)

Desired result: 70% of students will meet expectations

Student performance: 100% (3/3) of students met expectations

Observations:[this is the time to be detail-oriented and specific. Discuss what students do: "Most students were able to formulate the problem… More than 2/3rds made arithmetic or sign errors… Only one student drew a free-body diagram"]

Assessment: *[Circle back to the learning outcome. What does the student performance say about how this learning outcome is addressed in the course? "At this level, students need additional reinforcement about good problem-solving technique… "While we believe that students are meeting the program outcome, this particular measurement was too easy and did not adequately measure performance at the students' grade level."]*

Action: *[Recommended responses]*

CRITERIA 1

This form is to be used to record review group thoughts about assessment materials collected, including: appropriateness of materials gathered, recommendations for course changes, and recommendations for adjusting the assessment process.

Program (AE or ME): Date materials reviewed: Sept 27 – Oct 6, 2021

Criterion reviewed (circle one): 1 2 3 4 5 6 7

Criterion period (circle one): Mi6.8(c)1Td(4)Tj inc MiL-5 (t)3.7 (p9E -0 0-0.003 TwT*(e)3.212.3etie

CRITERIA 4

This form is to be used to record review group thoughts about assessment materials collected, including: appropriateness of materials gathered, recommendations for course changes, and recommendations for adjusting the assessment process.

Program (AE or ME): Date materials reviewed: 9

Reviewers: Michael Swartwout, Srikanth Gururajan, Chi Hou Lei

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For both semesters, a group project on design was assigned.

- individual and group: ethical, professional responsibilities
- Impact on global, economic, environmental, and societal concerns; and possible solution

Materials gathered in both semesters are appropriate.

No change is expected.

NA

NA

CRITERIA 7

AEME ABET Assessment Review Form

This form is to be used to record review group thoughts about assessment materials collected, including: appropriateness of materials gathered, recommendations for course changes, and recommendations for adjusting the assessment process.

Program (AE or ME): **ME** Date materials reviewed: Sept 27 – Oct 6

Criterion reviewed (circle one): 1 2 3 4 5 6 **7**

Criterion period (circle one): **Early** Middle Late

Semester(s) reviewed: ESCI 2300 (Thermodynamics) / Fall 20, Spring 20, Spring 21

Reviewers: Krishnaswamy Ravindra, Jenna Gorlewicz, Chi Hou Lei

Appropriateness of materials gathered:

Outcome 7 is: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Spring 2019 - (1/3 ME students met or exceeded 70%); Final Exam problem involving one of the main concepts in the course (conservation of energy) on a typical work producing device (turbine)

ESCI 2300 Fall 20 - 18/22 ME students met or exceeded - final exam problem involving some of the main concepts in the course (conservation of energy, entropy calculations, use of property tables) on a typical heat exchanging device (heat exchanger)

Spring 20 - 46/55 students met or exceeded - AE vs. ME not delineated; Two homework problems

We need to request for the number of AE and ME students to be listed on the evaluation form

We also need to consider what we are really measuring in this outcome and consider developing some consistency across the different courses that are being used to assess it.

The reviewers agree that the current assessment is appropriate, and no change is needed.

Other:
N/A

AEME ABET Assessment Review Form

This form is to be used to record review group thoughts about assessment materials collected, including: appropriateness of materials gathered, recommendations for course changes, and recommendations for adjusting the assessment process.

Program (AE or ME): **ME** Date materials reviewed: Sept 26 – Oct 6, 2021

Criterion reviewed (circle one): 1 2 3 4 5 6 **7**

Criterion period (circle one): Early Middle **Late**

Semester(s) reviewed: ME 4004 (Senior Design I) / Fall 2019, Fall 2020

Reviewers: Krishnaswamy Ravindra, Jenna Gorlewicz, Chi Hou Lei

Appropriateness of materials gathered:

(Fall 2019) - 100% (6/6 groups) Fall group reports were collected. Students demonstrate that they have learned new skills needed to resolve various issues in their designs / projects.
(Fall 2020) - 23/24 students met expectations on HW 1; 100% on HW1 and 2. The students worked on 4 teams of 5-7 students to design various systems. Individual and group homework assignments were collected. The intentions of the homework are to enable students to be aware of their deficiencies and explore ways to improve for the rest of the semester. Final reportesterovedd tssseuppe m-2 (e)4 (nt)-2 (is);1 ⁄4MCIy doium-2 (e)4 (nt)-2 (is) (t)-2 (

In addition, AE senior design routinely invites industry engineers to listen and evaluate the presentations. Such is not the case in ME design 1 and 2.
We should consider if design I and II are evaluated jointly.

Other:
N/A