Weber State University
Biennial Report on Assessment of Student Learning

Cover Page

Department/Program: Mechanical Engineering/Mechanical Engineering Technology
Academic Year of Report: 2022 and 2023 (covering Summer 2021 through Spring 2023)
Date Submitted: 11-14-23
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Report due 11/15/2023

A. Mission Statement

Information is current; no changes required: Yes

B. Student Learning Outcomes

Information is current; no changes required: No

Student learning outcomes have not been changed. Program Educations Objectives (PEOs) were updated with the latest "Self-Study" report submitted in 2021 to the Engineering Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (commonly referred to as the ETAC of ABET). These Program Education Objectives are:

1. Graduates will continue their professional development through involvement in professional organizations, formal educational opportunities, employer-based training programs, and other activities that enhance their technical and managerial abilities.
2. Graduates will be prepared to assume increasing levels of technical or managerial responsibility and to act as peer mentors in the area of Mechanical Engineering Technology or related fields.
3. Graduates will work to enhance their creativity and innovation in their approach to engineering design, solving problems, conducting experiments, and other critical aspects of their discipline.
4. Graduates will continue to improve in their ability to communicate effectively to diverse audiences through written, oral, and graphical means.
5. Graduates will exhibit a commitment to quality and ethics in their professional and personal lives.

C. Curriculum Grid

Information is current; no changes required: No

Some course names have been changed, though course content has remained mostly the same. Most of these name changes have been to avoid confusion between classes in Mechanical Engineering Technology (MET) and Mechanical Engineering. Courses with new names are listed below:

MET 1000 – Introduction to Mechanical Engineering Technology
MET 1500 – Mechanical Design for Engineering Technology
MET 3050 – Dynamics for Engineering Technology
MET 3400 – Machine Design for Engineering Technology

D. Program and Contact Information

Information is current; no changes required: Yes

E. Assessment Plan

Information is current; no changes required: Yes

The most recent internal assessment of the MET program (22-23 academic year) is presented below.

This report is a self-assessment of the Mechanical Engineering Technology Program at Weber State University performed by the Mechanical Engineering Technology (MET) Program Coordinator with feedback from faculty/staff who are active in the program who are: Dustin Birch, Randall Kent, Daniel Magda (Department Head), Bharath Nunna, and Spencer Petersen.

Quantitative Assessment

The program is assessed quantitatively by considering numerical values collected from several sources including:

- The Senior Assessment Exam, Senior Exit Survey
- Industrial Advisory Committee Survey
- Average scores from MET 4510 (Senior Project II) report and presentation rubrics
- Instructor course assessment rubrics from multiple MET courses including:
    - MET 3150 - Engineering Technology Materials
    - MET 3400 - Machine Design for Engineering Technology
    - MET 3500 - Mechanical Measurement and Instrumentation
    - MET 3700 - Testing and Failure Analysis

These metrics are evaluated in groups in order to assess student outcomes in the program. Target metrics were set for each of these quantitative values prior to collecting the data and analyzing the results. The collected data for this quantitative student outcome assessment is in Appendix A. For the 30 values the were collected and analyzed, each exceeded the target value. **No recommendations for MET program improvement were identified by quantitative assessment.**

Qualitative Assessment

The MET Program was qualitatively assessed during a meeting on 3 May by several faculty (Dustin Birch, Randy Hurd, Bharath Nunna, Spencer Petersen) who are active in the MET Program. The notes of this meeting are available in Appendix B**.** The conclusion of this meeting was that the MET Program is generally functioning well, but there are some areas for possible improvement which were identified along with actions that should be taken to address them. These areas for improvement are listed below. The program is continually assessed information by the acting Program Coordinator who has found some additional areas for improvement. **The recommendations for MET program improvement identified by qualitative program assessment are listed below:**

1. There is some confusion among freshman students about the differences between Mechanical Engineering Technology (MET) and Mechanical Engineering.
    a. Planned Action: Randy Hurd will create a presentation to be given during a guest lecture in MET 1000 – Introduction to Mechanical Engineering Technology, discussing the key differences between these two disciplines.
2. Common mistakes appear often in written assignments including casual language and low-quality figures.
    a. Planned Action: Randy Hurd has created a detailed rubric for technical reports that highlights common mistakes in writing and provides detailed information for what is expected from writing and in figures. Randy will share this rubric with the other faculty members to use in their courses.
3. A member of the Industrial Advisory Committee (IAC) commented that graduates do not appear to have a sufficient understanding of considering product ergonomics.
    a. Planned Action: Bharath Nunna will create a presentation on ergonomic considerations in engineering design to be presented to students in MET 4500 Senior Project I.
4. A member of the Industrial Advisory Committee (IAC) commented that graduates do not appear to have a sufficient understanding of project management.
    a. Planned Action: Dustin Birch will create a presentation on project management in engineering to be presented to students in MET 4500 Senior Project I.
5. MET 4650 – Thermal Science has too much information in a single class and should be split up. The current class covers topics in Thermodynamics, Fluid Mechanics, and Heat Transfer.
    a. Planned Action: Randy Hurd will submit a curriculum proposal to have MET 2500 – Modern Engineering Technologies will be replaced by a course on Thermodynamics, which will reduce the content covered in MET 4650 to Fluid Mechanic and Heat Transfer.

Program Coordinator will host an MET Program Assessment Meeting in May 2024 to review the MET Program and to determine if the planned actions listed above were completed and if they were effective. **No other recommendations for MET program improvement have been identified by the Program Coordinator at this time.**

Corrective Actions from Past Assessments

The last assessment of the MET Program was performed for the 2020-2021 academic year and complied into the 2021 MET Self-Study report which was delivered to the Engineering Technology Accreditation (ETA) Commission of ABET prior to a virtual accreditation visit during the fall semester of 2021. The suggested areas for improvement listed below come directly from the final statement from ETA Commission of ABET.

1. The final statement from the 2021 ABET evaluation of the MET program listed a concern that "review of student work from the senior projects did not show consistent ability to design systems for broadly-defined engineering problems appropriate for Mechanical Engineering Technology."
    a. Note that concerns provided by ABET do not require any action from the evaluated program. However, because the program faculty wish to provide the best possible educational experience to our students, we have chosen to respond internally to this concern provided by ABET. The following changes have been made to MET 4500 Senior Project I in response:
        i. All course sections have a consistent syllabus that lists expectations that students will show an ability to design systems for broadly-defined engineering problems.
        ii. All course sections now participate in a weekly faculty lecture series where several key aspects of engineering design are taught.
        iii. All course sections now require readings from the text "The Mechanical Design Process" by David Ullman
    b. We consider this concern to be sufficiently addressed.

2. The final statement from the 2021 ABET evaluation of the MET program listed a concern that "There was scant evidence that other feedback from the IAC had been sought of considered for strengthening the curriculum, such as capstone experience, or improving the program."
    a. Note that concerns provided by ABET do not require any action from the evaluated program. However, because the program faculty wish to provide the best possible educational experience to our students, we have chosen to respond to this concern provided by ABET. The following actions have been taken:
        i. An IAC meeting was hosted at Weber State University during the Spring 2023 semester in which the IAC was provided a survey about senior projects. This survey can be found in Appendix C.
        ii. Two suggestions from this IAC meeting were recorded and have planned actions that are listed in the bullets above.
    b. We consider this concern to be sufficiently addressed.

There are no outstanding concerns suggested by the ETAC Commission of ABET that have not been addressed by the MET Program.

Future Assessments

The MET Program Coordinator will perform another self-assessment (not for ABET) for the 2024-2025 academic year.

The MET Program is scheduled to prepare a Self-Assessment Report in 2027 evaluating the 2026-2027 academic year. This report is to be delivered to the Engineering Technology Accreditation Commission of ABET prior to an anticipated in-person accreditation visit by the same commission during the Fall 2027 semester.

F. Student Achievement

Will submit this information later per instructions given in report template.

G. Evidence of Learning

MET Self-Assessment Report - Appendix A: Quantitative Assessment of Student Outcomes

MET Student Outcome Evaluation (2022-2023)
Purple indicates that indicator is not used directly for outcome assessment (ABET), but still collected and reviewed.

Evaluation of SO1	**An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems in Mechanical Engineering Technology related to the analysis, design, development, and implementation of mechanical components, systems, or processes.**					
Indicator	**Method**	**Course(s)**	**Collected**	**Target**	**Score**	**Result**
Senior Assessment Exam Score	Exam Question	MET 4990	2023	> 65%	90%	*target met*
Senior Project Rubric (SP1) Indicator 8	Report Rubric	MET 4510	2023	>= 2	2.7	*target met*
MET 3400 Rubric, Indicator 1	Exam Question	MET 3400	2023	> 2.5	3	*target met*
MET 3700 Rubric, Indicator 1	Exam Question	MET 3700	2023	> 2.5	3.5	*target met*
IAC Annual Survey, Question 1	Survey Question	IAC Meeting	2023	> 3	4.75	*target met*
IAC Annual Survey, Question 3	Survey Question	IAC Meeting	2023	> 3	4.63	*target met*
Senior Exit Survey, Question 1	Survey Question	MET 4990	2023	> 3.5	4.7	*target met*

Evaluation of SO2	An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems in Mechanical Engineering Technology					
Indicator	**Method**	**Course(s)**	**Collected**	**Target**	**Score**	**Result**
Senior Project Rubric (SP1) Indicator 3	Report Rubric	MET 4510	2023	>= 2	2.7	*target met*
Senior Project Rubric (SP1) Indicator 4	Report Rubric	MET 4510	2023	>= 2	2.7	*target met*
Senior Project Rubric (SP2) Indicator 7	Pres. Rubric	MET 4510	2023	>= 2	2.9	*target met*
MET 3400 Rubric, Indicator 2	Exam Question	MET 3400	2023	> 2.5	2.5	*target met*
MET 3700 Rubric, Indicator 2	Exam Question	MET 3700	2023	> 2.5	4	*target met*
Senior Exit Survey, Question 2	Survey Question	MET 4990	2023	> 3.5	4.4	*target met*

Evaluation of SO3	An ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.					
Indicator	**Method**	**Course(s)**	**Collected**	**Target**	**Score**	**Result**
Senior Project Rubric (SP1) Indicator 5	Report Rubric	MET 4510	2023	>= 2	2.8	*target met*
Senior Project Rubric (SP1) Indicator 6	Report Rubric	MET 4510	2023	>= 2	2.9	*target met*
Senior Project Rubric (SP1) Indicator 7	Report Rubric	MET 4510	2023	>= 2	2.7	*target met*
Senior Project Rubric (SP2) Indicator 2	Pres. Rubric	MET 4510	2023	>= 2	2.7	*target met*
Senior Project Rubric (SP2) Indicator 5	Pres. Rubric	MET 4510	2023	>= 2	2.8	*target met*
MET 3500 Rubric, Indicator 1	Report Rubric	MET 3500	2023	> 2.5	4	*target met*
Senior Exit Survey, Question 3	Survey Question	MET 4990	2023	> 3.5	4.7	*target met*

Evaluation of SO4	An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes.					
Indicator	**Method**	**Course(s)**	**Collected**	**Target**	**Score**	**Result**
Senior Project Rubric (SP1) Indicator 2	Report Rubric	MET 4510	2023	>= 2	2.6	*target met*
MET 3150 Rubric, Indicator 1	Lab Assignment	MET 3150	2023	> 2.5	3	*target met*
MET 3150 Rubric, Indicator 3	Lab Assignment	MET 3150	2023	> 2.5	3	*target met*
MET 3400 Rubric, Indicator 3	Exam Question	MET 3400	2023	> 2.5	3	*target met*
MET 3700 Rubric, Indicator 3	Exam Question	MET 3700	2023	> 2.5	4	*target met*
Senior Exit Survey, Question 4	Survey Question	MET 4990	2023	> 3.5	4.4	*target met*

Evaluation of SO5	An ability to function effectively as a member as well as a leader on technical teams.					
Indicator	**Method**	**Course(s)**	**Collected**	**Target**	**Score**	**Result**
Senior Project Peer Review Rubric (SP3)	Rubric	MET 4510	2023	>= 2	3	*target met*
Senior Project Instructor Review Rubric (SP4)	Rubric	MET 4510	2023	>= 2	2.91	*target met*
Senior Project Rubric (SP2) Total Score	Pres. Rubric	MET 4510	2023	>= 2	3.72	*target met*
Senior Exit Survey, Question 5	Survey Question	MET 4990	2023	> 3.5	4.8	*target met*

MET Self-Assessment Report - Appendix B: Program Assessment Meeting Notes

Meeting – 3 May 2023

Attendees: Dustin Birch, Spencer Petersen, Bharath Nunna & Randy Hurd

(AI = Action Item, i.e. Assignment)

Discussion Items

1. Observations from classes
    a. No major concerns
    b. Some misunderstanding on difference between MET and ME.
        i. *AI - Make presentation for MET 1000 – Randy Hurd*
2. Discussion of student engagement in Senior Project class (MET 4500/4510)
    a. MET students demonstrate good engagement in senior project classes
3. Feedback from April Industrial Advisory Committee Meeting
    a. Content on ergonomics
        i. *AI – Create presentation for MET 4500 – Bharath Nunna*
    b. Content on project management
        i. *AI – Create presentation for MET 4500 – Dustin Birch*
4. Senior MET Assessment Exam
    a. No odd results, student exceeded minimum goal of 70% average
    b. 2 MET students passed FE exam
5. Senior MET Survey Results
    a. No concerning feedback

6. Enrollment/Recruitment
    a. Enrollment (2017-2022): 213, 153, 121, 93, 115, 105
7. Software in classes
    a. Continue teaching VBA and Python
8. Technical writing
    a. Common mistakes are poor figures, casual language
        i. *AI – Share writing rubric to promote consistency – Randy Hurd*
9. Technical presentations
    a. Decided we will try to have at least one writing/presentation assignment per class
10. Discussion and/or application of engineering standards

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Industrial Advisory Committee (IAC) Survey Questionnaire

Name: _____ Date: _____

Company Name: _____

Please complete the following questionnaire with specific regard to the inquiry by placing a CROSS in the appropriate box [X]

	strongly agree	agree	uncertain/ not applicable	disagree	strongly disagree
1. Senior projects demonstrate enough functional requirements to put engineering design and skills into practice.	☐	☐	☐	☐	☐
2. Senior projects satisfy the design requirements of systems/ components/ processes appropriate for undergraduate students.	☐	☐	☐	☐	☐
3. Senior projects demonstrate major engineering design experience for students that incorporates appropriate engineering standards and constraints.	☐	☐	☐	☐	☐
4. Senior projects require the use of industrial-quality laboratory equipment and engineering software for analysis and testing.	☐	☐	☐	☐	☐

Additional Comments/Feedback:

Course Rubrics referenced in "MET Self-Assessment Report - Appendix A"

Mechanical Engineering Technology				Sheet1					
COURSE	**MET 3150 Engineering Technology Materials**								
SEMESTER	**Fall/Spring**								
YEAR	**2022-2023**						S = 1 or 2: action initiated by instructor		
INSTRUCTOR	**Daniel J.**						S = 3 or 4: no action initiated by instructor		
Outcome #4 an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes									
	Student	1	2	3	4	Score	Initiate		
Indicator	Outcomes	Unsatisfactory	Developing	Satisfactory	Exemplary	(S)	by	Action to be initiated	
Perform a Rockwell Hardness measurement in accordance with the ASTM E18-20 standard.	4	Doesn't understand the importance of metal Rockwell hardness in the engineering context	Does understand the importance of the measurements, but doesn't understand the nuances of the procedure or machine	Does understand the importance of the measurements and procedure, but doesn't understand how to interpret the data	Understands the measurement, the correct procedure, and interprets the data accurately	**3**		Labs were done virtually due to equipment not set up in the new engineering building	
Perform a Jominy End Quench Test Measurement in accordance with the ASTM E255-20 standard.	4	Doesn't understand the importance of metal Jominy End Quench measurement in the engineering context	Does understand the importance of the measurements, but doesn't understand the nuances of the procedure	Does understand the importance of the measurements and procedure, but doesn't understand how to interpret the data	Understands the measurement, the correct procedure, and interprets the data accurately	**3**		Labs were done virtually due to equipment not set up in the new engineering building	
Perform a tensile test measurement in accordance with the ASTM E8-20 standard.	4	Doesn't understand how to set up the tensile test machine nor understand the Instron machine setup	Can take set up machine and take measurements, but doesn't understand how to interpret the data	Occasional errors in obtaining data and in data interpretation	Successfully sets up machine, takes data, and interprets the data accurately	**3**		Labs were done virtually due to equipment not set up in the new engineering building	
Perform an Impact test measurement in accordance with the ASTM E23-18 standard.	4	Doesn't understand how to set up the Impact test machine nor understand the correct machine setup for a Charpy test	Can take set up machine and take measurements, but doesn't understand how to interpret the data	Occasional errors in obtaining data and in data interpretation	Successfully sets up machine, takes data, and interprets the data accurately	**3**		Labs were done virtually due to equipment not set up in the new engineering building	
					Average Score for	**3**			

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Mechanical Engineering Course Rubric								
COURSE	MET 3400 Machine Design							
SEMESTER	Fall							
YEAR	2022						S = 1 or 2: action initiated by instructor	
INSTRUCTOR	Birch						S = 3 or 4: no action initiated by instructor	
Indicator	Student Outcomes	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Exemplary	Score (S)	Initiate action by instructor ?	Action to be initiated
Understands powertrain analysis, and can apply engineering and mathematical tools to predict the mechanism performance.	1	Cannot appropriately analyze a powertrain.	Can apply some knowledge of powertrain analysis, but cannot analyze complex arrangements of power transmitting components.	Can apply appropriate strategies for design and analysis of powertrains. For complex powertrain arrangements, appropriate predictions of performance are achieved.	Nearly always applies appropriate strategies for design and analysis of powertrains. For very complex powertrain arrangments, appropriate predictions of performance are achieved.	4	NO	
Understands how to design an appropriate bolted connection, utilizing skills in designing components based on broad based engineering problems.	2	Cannot appropriately design a bolted connection.	Can apply some knowledge of the design of bolted connections, but cannot consistently achieve a suitable engineered solution.	Can apply knowledge of the design of bolted connections, and can consitently achieve a suitable engineered solution.	Nearly always applies knowledge of the design of bolted connections, and can consitently achieve a suitable engineered solution.	3	NO	
Can interpret test data to analyze a column for compressive buckling.	4	Cannot appropriately interpret material test data to design a column for buckling.	Can appropriately interpret some material test data to design a column for buckling, but cannot consistently achieve a suitable engineered solution.	Can appropriately interpret material test data and can consistently design a column for buckling.	Nearly always interprets material test data correctly, and can use it to design a column for buckling.	3	NO	
					Average Score for Course =	3.3		
					(Transfer this number to course continuous improvement record kept by dept. chair)			

Mechanical Engineering Course Rubric								
COURSE	MET 3700 Testing & Failure Analysis							
SEMESTER	Spring							
YEAR	2023						S = 1 or 2: action initiated by instructor	
INSTRUCTOR	Birch						S = 3 or 4: no action initiated by instructor	
Indicator	Student Outcomes	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Exemplary	Score (S)	Initiate action by instructor ?	Action to be initiated
Understands stress analysis, and can apply appropriate engineering and mathematical tools to predict material performance.	1	Cannot appropriately calculate stress.	Can apply some knowledge of stress analysis, but cannot consistently analyze atypcial shapes.	Can apply appropriate strategies for stress analysis. For atypical shapes, appropriate predictions of stress are achieved.	Nearly always applies appropriate strategies for stress analysis. For atypical shapes, appropriate predictions of stress are achieved.	4	NO	
Understands how to assess design risk based on broad based reliability and failure rate information. Can use this information to asign RPN in an FMEA.	2	Cannot appropriately assess design risk.	Can apply some knowledge of design risk, but cannot consistently assign an RPN in FMEA.	Can apply knowledge of design risk, and can consitently assign an RPN in FMEA.	Nearly always applies knowledge of design risk, and can consitently assign an RPN in FMEA.	4	NO	
Can interpret test requirements to appropriately design a beam fatigue test.	4	Cannot appropriately interpret test requirements to design a beam fatigue test.	Can appropriately interpret some test requirements to design a beam fatigue test, but cannot consistently achieve a suitable engineered solution.	Can appropriately interpret test requirements to design a beam fatigue test and consistently achieves a suitable engineered soluiton.	Nearly always appropriately interprets test requirements to design a beam fatigue test and consistently achieves a suitable engineered soluiton.	4	NO	
					Average Score for Course =	4.0		
					(Transfer this number to course continuous improvement record kept by dept. chair)			

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Mechanical Engineering Course Rubric								
COURSE	MET 3500 Measurement and Instrumentation							
SEMESTER	Spring							
YEAR	2023						S = 1 or 2: action initiated by instructor	
INSTRUCTOR	Spencer Petersen						S = 3 or 4: no action initiated by instructor	
Indicator	Student Outcomes	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Exemplary	Score (S)	Initiate action by instructor ?	Action to be initiated
1.Students can collect, plot and describe measurement data.	5	Collected data do not appear to have been collected carefully. Student has forgotten major component of plotted data such as an axis label or axis ranges are poorly chosen. Student has not included caption.	Collected data appear to have been collected carefully. Axes are labeled. Plot caption accurately describes trends.	Collected data appear to have been collected appropriately. Axes are labeled with titles and units. Plot caption accurately describes trends.	Collected data appear to have been collected both appropriately and carefully. Axis ranges are appropriate, and axes are labled with titles and units. Data markers and/or line type choices do not distract. Plot caption accurately describes trends and makes inferences from observations.	4	no	N/A
2. Students can appropriately calculate and apply a z-score and/or t-score.		<50%	>50%	>70%	>90% of students are able to calculate the correct z-score value (or t-score) to predict the percentage of data that would be expected to fall above or below a given value.	4	no	N/A
3. Students can calculate random and systematic uncertainty.		<50%	>50%	>70%	>90% of students accuractely calculated random and systematic uncertainy given a set of data and the necessary instrument specifications.	2	yes	Only random and this point. Added an example to lecture, homework, and exam, including systematic.
4. Students can calculate propagated uncertainty.		<50%	>50%	>70%	>90% of students accuractly calculated propagated uncertainty.	4	no	
5. Students can select necessary minimum sampling frequency for a given signal (application of Nyquist frequency).		<50%	>50%	>70%	>90% of students can identify the mimimum required sampling frequency, given the maximum possible frequency of a signal to be measured.	1	yes	Add lecture, homework, and exam content for necessary sampling frequency.
6. Students can apply a Fast Fourier Transform (FFT) to identify the dominant frequency in a given signal.		<50%	>50%	>70%	>90% of the students can identify the dominant frequency from a noisy signal by applying an FFT.	4	no	
7. Students can calculate fundamental instrument responce parameters such as rise time.		<50%	>50%	>70%	>90% of students calculated the correct rise time from a provided data set.	3	no	
8. Students demonstrate a basic knowledge of when to use a low-pass filter.		<50%	>50%	>70%	>90% of the students can correctly select a low-pass filter to eliminate high frequency noise from a signal.	4	no	
9. Students demonstrate an understanding of basic electrical concepts such as capacitance.		<50%	>50%	>70%	>90% students can correctly identify how changing an attribute of a capacitor will change the resulting capacitance.	4	no	
10. Students demonstrate the ability to perform a calibration on a common instrument (thermocouple).		<50%	>50%	>70%	>90% can correctly calculate the appropriate transfer fucntion from a provided data set.	**3**	no	
					Average Score for Course =	**3.3**		
					(Transfer this number to course continuous improvement record kept by dept. chair)			

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Appendix A

The last assessment of the MET Program was performed for the 2020-2021 academic year and complied into the 2021 MET Self-Study report which was delivered to the Engineering Technology Accreditation (ETA) Commission of ABET prior to a virtual accreditation visit during the fall semester of 2021. The suggested areas for improvement listed below come directly from the final statement from ETA Commission of ABET.

Date of Program Review: Nov. 2021	Recommendation	Progress Description
Recommendation 1	ABET "Concern": This criterion states: "Baccalaureate degree curricula must provide a capstone or integrating experience that develops student competencies in applying both technical and non-technical skills in solving problems." Review of student work from the senior projects did not show consistent ability to design systems for broadly-defined engineering problems appropriate for mechanical engineering technology. Without a sufficiently broad capstone or integrating experience, the program may not prepare the students sufficiently for the needs of the program's constituents. The strength of compliance with this criterion is lacking.	Note that concerns provided by ABET do not require any action from the evaluated program. However, because the program faculty wish to provide the best possible educational experience to our students, we have chosen to respond internally to this concern provided by ABET. The following changes have been made to MET 4500 Senior Project I in response:
		All course sections have a consistent syllabus that lists expectations that students will show an ability to design systems for broadly-defined engineering problems.
		All course sections now participate in a weekly faculty lecture series where several key aspects of engineering design are taught.
		All course sections now require readings from the text "The Mechanical Design Process" by David Ullman
		We consider this concern to be sufficiently addressed.

Recommendation 2	ABET "Concern": This criterion states: "An advisory committee with representation from organizations being served by the program graduates must periodically review the program's educational objectives and curriculum. The advisory committee must provide advisement on current and future aspects of the technical fields for which the graduates are being prepared." The program provided minutes of meetings with its constituents where various program-related issues had been discussed. However, the evidence shows that there is little involvement of the industrial advisory committee (IAC) members other than this annual meeting. There was scant evidence that other feedback from the IAC had been sought or considered for strengthening the curriculum, such as capstone experience, or improving the program. Without active engagement from the IAC, the program risks not preparing the students for future aspects of their field. There is a potential that future compliance with this criterion could be jeopardized.	#### +1 progress Note that concerns provided by ABET do not require any action from the evaluated program. However, because the program faculty wish to provide the best possible educational experience to our students, we have chosen to respond to this concern provided by ABET. The following actions have been taken:
		An IAC meeting was hosted at Weber State University during the Spring 2023 semester in which the IAC was provided a survey about senior projects. This survey can be found in Appendix C.
		Two suggestions from this IAC meeting were recorded and have planned actions that are listed in the bullets above.
		We consider this concern to be sufficiently addressed.

Additional narrative:

There are no outstanding concerns suggested by the ETAC Commission of ABET that have not been addressed by the MET Program.

Appendix B

Please provide the following information about the full-time *and adjunct faculty* contracted by your department during the last academic year (summer through spring). Gathering this information each year will help with the headcount reporting that must be done for the final Five-Year Program Review document that is shared with the State Board of Regents.

Faculty Headcount	2019-20	2020-21	2021-22	2022-23
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)				
Full-time Tenured	2	3	3	3
Full-time Non-Tenured (includes tenure-track)	2	2	3	3
Part-time and adjunct	1	1	1	1
With Master's Degrees				
Full-time Tenured	1	0	0	0
Full-time Non-Tenured	1	1	1	1
Part-time and adjunct	1	2	1	1
With Bachelor's Degrees				
Full-time Tenured				
Full-time Non-tenured				
Part-time and adjunct				
Other				
Full-time Tenured				
Full-time Non-tenured				
Part-time				
Total Headcount Faculty				
Full-time Tenured	3	3	3	3
Full-time Non-tenured	3	3	4	4
Part-time	2	3	2	2

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Appendix C

1) Looking back at your previous biennial report where you identified strategies for improvement, what progress has been made in implementing improvements?

Concerns Listed in Previous Biennial Report

1. "The program does not involve all constituents and does not review the program educational objectives regularly. This finding remains a Concern until the program demonstrates, through a documented systematically utilized and effective process, periodic review of the program educational objectives involving all program constituencies."

Response:
The program educational objectives were reviewed with a past Dean of EAST who has also served as a program reviewer for the accreditation body ABET. Considering the advice given during these meetings, the program educational objectives were reviewed and approved by the faculty. The program also conducted a meeting last spring with the industrial advisory committee where the program educational objectives were presented and approved without any suggested edits.

2. "The accreditation body is incorrectly identified as TAC on pages 13 and 115 of the Catalog and as Accreditation Board for Engineering and Technology in the brochure for the mechanical engineering technology program."

Response:
The catalog no longer lists accreditation for specific degrees. The program has moved to electric material rather than physical brochures. Program accreditation is listed correctly on the MET website (https://weber.edu/me/met.html).

2) Please take a few minutes to review the new DFWI dashboard in the Report Gallery. This dashboard allows you to see the percentage of students in each course who earn a D+, D, D-, E, W, UW, or NC grade. The data can be filtered by several parameters. Reflect on the DFWI rates overall and of your underserved minority students versus your Caucasian students:

   a. What are you seeing?

      Rates are highest in MET 1000, MET 3050, and MET 4650

   b. What concerns you?

      - MET 1000 (Intro. class) is understandable and many students perceive this program to be extremely hands-on without much math, but the curriculum is still quite math intensive compared to the average program. However, I would like to speak with the instructor for MET 1000 to see if he has any additional insights into this.

- MET 3050 (Dynamics for Engineering Technology) is the most surprising to me, but perhaps shouldn't be. Our 1000 and 2000 level classes are not too theoretically complex as we want to give the students time to complete their math and science classes. However, the 3000-level classes start to delve into the theoretical topics in the discipline which tend to be more difficult to learn. I should have considered that an early class at the 3000-level might be difficult for students. I would like to speak to the instructor to discuss ideas for supporting the students through what might be a difficult transition.

- MET 4650 (Thermal Science) is generally understood to be our most difficult class in the program. Important concepts are covered from the topics of thermodynamics, heat transfer, and fluid mechanics. We as a faculty have decided this may be a bit too much for a single class (though other MET programs do the same as us and ABET has not mentioned any concerns about this). We have submitted a change to the curriculum committee that would add a standalone 2000-level thermodynamics course to the MET curriculum and allow more time to cover the other two topics in MET 4650. We think that giving students more time in MET 4650 to study and learn these concepts will improve student success.

c. What additional data could be beneficial?

I can't think of any suggestions at the moment.

3) We have invited you to re-think your program assessment. What strategies are you considering? What support or help would you like.

Our latest Self-Assessment Report for the MET program is provided in Section E. We feel that that this approach to self-assessment is an improvement over our previous approach because it gathers both qualitative and quantitative data. Additionally, the quantitative data is gathered using non-biased metrics that depend on grades on specific assignments or homework questions rather than instructor opinion. Data is also gathered from a broad range of sources including the Senior Exit

Report due 11/15/2023