Weber State University
Biennial Report on Assessment of Student Learning

Cover Page

Department/Program: Mechanical Engineering / Mechanical Engineering Technology
Academic Year of Report: 2019/20 (covering Summer 2017 through Spring 2020)
Date Submitted: 1/13/2021
Report author: Daniel J. Magda

Contact Information: Daniel J. Magda
Phone: 801-626-7636
Email: dmagda@weber.edu

We have updated the Institutional Effectiveness website, which includes an update for each program page. All Biennial Assessment and Program Review reports will now be available on a single page. Please review your page for completeness and accuracy, and indicate on the list below the changes that need to be made. Access your program page from the top-level results page. Select the appropriate college and then your program from the subsequent page.

A. Mission Statement

_X__ Information is current; no changes required.

Update if not current:

B. Student Learning Outcomes

_X__ Information is current; no changes required.

Update if not current:

C. Curriculum (please note, we are using Google Sheets for this section so that updates are easier to make)

___ Information is current; no changes required.

Update if not current (you may have access to the Google Sheet if that is easiest, or we can make the updates):

I = Introduced **R = Reinforced** **E = Emphasized** Core & Support Courses in the Program	Department/Program Learning Outcomes										
	Learning Outcome 1	Learning Outcome 2	Learning Outcome 3	Learning Outcome 4	Learning Outcome 5	Learning Outcome 6	Learning Outcome 7	Learning Outcome 8	Learning Outcome 9	Learning Outcome 10	Learning Outcome 11
MET 1000 Intro to Mech Engr Tech & Des	I	I	I	I	I	I	I				
MET 1500 Mechanical Design Engr	I	I	I	R	I	I	I				
MET 2500 Modern Engineering Tech	I	I			R	R	R	I	I	I	
MET 3050 Dynamics	R										
MET 3150 Engr Tech Materials	R		R				R				
MET 3300 Comp Prog Apps in MET	R					R					
MET 3400 Machine Design	R										
MET 3500 Mech Measure & Inst	R		R			R					
MET 3700 Testing & Failure Analysis	R	R			R	R		R	R	R	
MET 4200 Mech Design with FEA	R			R		R					
MET 4500 Senior Project I	E	R	E	E	E	E	E	R	R	R	E
MET 4510 Senior Project II	E	R	E	E	E	E	E	R	R	R	E
MET 4650 Thermal Sciences	E	E									
MET 4990 Seminar in MET								E	E	E	E
DET 1010 Intro to Eng & Technical Des	I	I		I							
MFET 1210 Machining Principals	I	I					I				
MFET 2300 Statics & Strengths of Materials	R										
MFET 2360 Manufacturing Proc & Materials	R	I									
MFET 3340 Applied Fluid Power	R										
EET 1850 Industrial Electronics	R										
MATH 1080 Pre-Calculus	I										
MATH 1210 Calculus I	R										
CHEM 1110 Elementary Chemistry	I										
PHYS 2210 Physics for Scientists & Engineers	I										
Technical Electives	R	R	R			R					

D. Program and Contact Information

___ Information is current; no changes required.

Update if not current:

Prof. Daniel J. Magda, Ph.D.
Weber State University
Mechanical Engineering Dept. Chair
1802 University Circle
Ogden, UT. 84408-1802
Ph. 801-626-763
dmagda@weber.edu

Mechanical Engineering Technology is a program offered under the Mechanical Engineering Department. Mechanical engineering technology is the practical application of mechanical engineering. Mechanical engineering technologists play an integral role in product design and manufacturing process cycles which include planning, design, analysis, testing and documentation. They utilize skills in materials science, engineering mechanics, thermal science, design, instrumentation and technical writing.

The curriculum includes problem-solving courses such as statics, strength of materials, dynamics, machine design, thermodynamics, fluid mechanics and heat transfer that are based on engineering science and mathematics. Integrated into many of the courses are laboratory and project oriented experiences that teach the practical, hands-on aspects of mechanical engineering technology. A balanced blend of engineering science and practical applications provides the mechanical engineering technologist the knowledge and skills needed to be successful in today's technical workplace. Mechanical engineering technology has lead to numerous opportunities for exciting, creative and rewarding careers in a wide range of industries including aerospace, automotive, electronics, manufacturing, medical equipment, mining and power generation.

E. Assessment Plan (please see our website for details on how to develop a program assessment plan)

_X__ Information is current; no changes required.

Update if not current: (this update can be via a Google Sheet if that iss easiest; we can then embed the Google Sheet on your program web page, as we do with the curriculum grid)

New: High Impact Educational Experiences in the Curriculum
In response to the recent USHE requirement that all students have at least 1 HIEE in the first 30 credit hours and 1 HIEE in the major or minor we are asking programs to map HIEEs to curriculum using a traditional curriculum grid. This helps demonstrate how and where these goals are accomplished.

Courses	Department/Program use of High Impact Educational Experiences							
	HIEE 1	HIEE 2						
MET 2890 INT Coop Work Experience (Lower division)	Engineering work experience							
MET 4510 Senior Project II (Upper division)	Project Based Learning	Team Based Learning						

HIEEs include capstone courses or experiences, community-engaged learning, evidence-based teaching practices, internships, project-based learning, study abroad/away, supplemental instruction, team-based learning, undergraduate research, pre-professional/career development experiences.

Additional information (HIEE planning, assessment, or other information):

F. Report of assessment results since the last report:

There are varieties of ways in which departments can choose to show evidence of learning. This is one example. The critical pieces to include are 1) learning outcome being assessed, 2) method(s) of measurement used, 3) threshold for 'acceptable – that is, the target performance, 4) actual results of the assessment, 5) interpretation/reflection on findings 6) the course of action to be taken based upon the interpretation, and 7) how that action will be evaluated.

A. Evidence of Learning: Courses within the Major

Evidence of Learning: Courses within the Major					
Measureable Learning Outcome	Method of Measurement	Threshold for Evidence of Learning	Findings Linked to Outcomes	Interpretation of Findings	Action Plan/Use of Results
1. The ability to apply the knowledge, techniques, skills and modern tools of the discipline, including technologies of materials, applied mechanics, computer-aided drafting/design, manufacturing processes, tooling, production operations, thermal fluid science and statistics	1. MET Exit Exam	60% of students receiving a minimum 60% on the MET Exit Exam Part I & II.	100% of all students in the MET program have cumulatively tested above 60% for Parts I & II of the exam. Overall group average score of 91%. (Data collected Spring Semester 2020)	Acceptable level of performance to specified metric.	No action required at present. Continue testing and monitoring results.
2. The ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of	1. MET Exit Exam	60% of students receiving a minimum 60% on the MET Exit Exam Part I & II.	100% of all students in the MET program have cumulatively tested above 60% for Parts I & II of the exam. Overall group average score of 91%. (Data	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.

principles and applied procedures or methodologies.			collected Spring Semester 2020)		
2. (Cont)	2. Senior Project - design evaluation rubric	Minimum of 2.0 composite score based on senior project design review rubric	Composite score of 2.8 based on one senior project evaluated from Spring Semester 2020.	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.
2. (Cont)	3. Student presentation and design documentation	Evaluation and approval of faculty advisor following review of submitted documentation.	Typically all project documentation has met or exceeded minimum expectations.	Acceptable level of performance to specified criteria.	No action required at present. Continue to evaluate.
3. The ability to conduct, analyze and interpret experiments and apply experimental results to improve processes.	1. Senior Project - design evaluation rubric	Minimum of 2.0 composite score based on senior project design review rubric	Composite score of 2.8 based on one senior projects evaluated from Spring Semester 2020.	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.
3. (Cont)	2. Student presentation and design documentation	Evaluation and approval of faculty advisor following review of submitted documentation.	Typically all project documentation has met or exceeded minimum expectations.	Acceptable level of performance to specified criteria.	No action required at present. Continue to evaluate.
4. The ability to apply creativity to design of systems, components and processes.	1. Senior Project - design evaluation rubric	Minimum of 2.0 composite score based on senior project design review rubric	Composite score of 2.8 based on one senior projects evaluated from Spring Semester 2020.	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.
4. (Cont)	2. Student presentation and design documentation	Evaluation and approval of faculty advisor following review of submitted documentation.	Typically all project documentation has met or exceeded minimum expectations.	Acceptable level of performance to specified criteria.	No action required at present. Continue to evaluate.

5. The ability to function effectively as a member or leader of a team.	1. Senior Project - design evaluation rubric	Minimum of 2.0 composite score based on senior project design review rubric	Composite score of 2.8 based on one senior projects evaluated from Spring Semester 2020.	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.
5. (Cont)	2. Senior Project –peer and instructor evaluation review rubric	Peer & Instructor evaluation rubric average of 2.0 or higher.	Average peer rubric average of 2.9 and instructor average of 2.9 based on one evaluated senior project team from Spring Semester 2020.	Acceptable level of performance to specified criteria.	No action required at present. Continue to evaluate.
6. An ability to demonstrate creativity in designing solutions to problems through analysis and experimentation leading to modification of systems, components and processes.	1. Senior Project – design evaluation rubric	Minimum of 2.0 composite score based on senior project design review rubric	Composite score of 2.8 based on one senior projects evaluated from Spring Semester 2020.	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.
6. (Cont)	2. Student presentation and design documentation	Evaluation and approval of faculty advisor following review of submitted documentation.	Typically all project documentation has met or exceeded minimum expectations.	Acceptable level of performance to specified criteria.	No action required at present. Continue to evaluate.
7. An ability to communicate effectively using written, oral, and graphical forms of communication.	1. Senior Project – design evaluation rubric	Minimum of 2.0 composite score based on senior project design review rubric	Composite score of 2.8 based on one senior projects evaluated from Spring Semester 2020.	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.
7. (Cont)	2. Student presentation and design documentation	Evaluation and approval of faculty advisor following review of submitted documentation.	Typically all project documentation has met or exceeded minimum expectations.	Acceptable level of performance to specified criteria.	No action required at present. Continue to evaluate.

8. A recognition of the need for and the ability to pursue lifelong learning.	1. Exit Survey	50% of all survey respondents have joined or plan to join a professional society and/or attend graduate school. (An average Likert rating of 2 indicates 50% agreement. An average Likert rating of >4 indicates 100% agreement)	100% of all respondents plan to join a professional society and/or attend graduate school. Average Likert score of 4.8. (Data collected Spring Semester 2021)	Acceptable level of performance to specified criteria.	No action required at present. Continue to evaluate.
8. (Cont)	2. MET 4990 Coursework	90% of students with successful completion of MET 4990.	100% of all MET students successfully completed MET 4990. (Data collected Spring Semester 2020)	Acceptable level of performance to specified criteria.	No action required at present. Continue to evaluate.
9. An understanding of professional, ethical and social responsibilities.	1. MET 4990 Coursework	90% of students with successful completion of MET 4990.	100% of all MET students successfully completed MET 4990. (Data collected Spring Semester 2020)	Acceptable level of performance to current specified metric.	No action required at present. Continue to evaluate.
9. (Cont)	2. MET Exit Exam (Ethics & Diversity Section)	60% of students receiving a minimum of 60% on the MET Exit Exam Part III.	100% of all students in the MET program have cumulatively tested above 60% for Part III of the exam. Overall group average score of 82%. (Data collected Spring Semester 2020)	Acceptable level of performance to current specified metric.	No action required at present. Continue to evaluate.

10. A respect for diversity, and a knowledge of contemporary professional, societal, and global issues.	1. MET 4990 Coursework	90% of students with successful completion of MET 4990.	100% of all MET students successfully completed MET 4990. (Data collected Spring Semester 2020)	Acceptable level of performance to current specified metric.	No action required at present. Continue to evaluate.
10. (Cont)	2. MET Exit Exam (Ethics & Diversity Section)	60% of students receiving a minimum of 60% on the MET Exit Exam Part III.	100% of all students in the MET program have cumulatively tested above 60% for Part III of the exam. Overall group average score of 82%. (Data collected Spring Semester 2020)	Acceptable level of performance to current specified metric.	No action required at present. Continue to evaluate.
11. A commitment to quality, timeliness and continuous improvement.	1. MET 4990 Coursework	90% of students with successful completion of MET 4990.	100% of all MET students successfully completed MET 4990. (Data collected Spring Semester 2020)	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.
11. (Cont)	2. Exit Survey	50% of all survey respondents indicate they understand the concepts of quality and continuous improvement and plan to utilize these philosophies in their careers. (An average Likert rating of 2 indicates 50% agreement. An average Likert rating of >4 indicates 100% agreement)	100% of all respondents indicate they understand the concepts and tenants of quality, timeliness, and continuous improvement, and plan to utilize these philosophies in their careers. Average Likert score of 5.0 (Data collected Spring Semester 2021) .	Acceptable level of performance to specified metric.	No action required at present. Continue to evaluate.

Appendix A

Most departments or programs receive a number of recommendations from their Five/Seven-Year Program Review processes. This page provides a means of updating progress towards the recommendations the department/program is enacting.

Narrative:

Concerns

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 has scheduled a meeting this spring with its industrial advisory committee where the program educational objectives will be reviewed and a schedule for the regular and systematic review of the objectives will be established. ETAC of ABET will be provided with the minutes of this meeting. However the program would point out that ETAC of ABET does not specify which groups should be included as constituents and thus should not be stating that "all program constituencies" are not being involved in the review and revision process.

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 correct identification of ETAC has been submitted as an editorial change to the catalog and it should be formalized for fall semester. The program's brochure will be reprinted.

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	2017-18	2018-19	2019-20
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)			
Full-time Tenured	2	2	2
Full-time Non-Tenured (includes tenure-track)	2	2	2
Part-time and adjunct	1	1	1
With Master's Degrees			
Full-time Tenured	1	1	1
Full-time Non-Tenured	1	1	1
Part-time and adjunct		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	7	8	8
Full-time Tenured	3	3	3
Full-time Non-tenured	4	3	3
Part-time		2	2

Appendix C – alternative format for Evidence of Learning Reporting; this can be in table form or as a narrative.
Please respond to the following questions.

1) First year student success is critical to WSU's retention and graduation efforts. We are interested in finding out how departments support their first-year students. Do you have mechanisms and processes in place to identify, meet with, and support first-year students? Please provide a brief narrative focusing on your program's support of new students:

2) **Any** first-year students taking courses in your program(s) Yes

   EAST advisors and program coordinators meet with students that need support.

   a. Students declared in your program(s), whether or not they are taking courses in your program(s) Yes

3) A key component of sound assessment practice is the process of 'closing the loop' – that is, following up on changes implemented as a response to your assessment findings, to determine the impact of those

changes/innovations. It is also an aspect of assessment on which we need to improve, as suggested in our NWCCU mid-cycle report. Please describe the processes your program has in place to 'close the loop'.

This is addressed in Section E assessment plan for closing the loop in continuous improvement.