Weber State University
Biennial Assessment of Evidence of Learning

Cover Page

Department/ Manufacturing & Systems Engineering
Program: Product Design and Development: An Engineering Technology
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A. Brief Introductory Statement:

The PDD program is designed to prepare the student for professional employment in the design, service, or public sectors. The PDD program is based on fundamental engineering knowledge, skills, and processes; including: drafting and design of mechanical/manufacturing components, 3D mechanical modeling and 2D technical drawings, metal forming, casting, welding, tool design, photoshop and rapid prototyping.

Students complete a year-long senior project with a team that brings together their experience and education. The senior projects help the student gain confidence in their abilities while gaining additional insight and skills in both teamwork and human relations.

The design portion of the emphasis provides the knowledge and skills required to fulfill a number of career roles that focus on product design and development process. Concepts that are introduced throughout the curriculum include: professional 3D modeling and 2D technical drawings, understanding of manufacturability of different materials and effective technical communication skills.

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B. Mission Statement

Manufacturing and Systems Engineering Department. Product Design and Development Program

Mission Statement

The PDD Program at Weber State University will be a growing, nationally recognized, program offering ABET Accredited BS degrees that afford faculty and students opportunities for intellectual and personal growth. We will prepare students to demonstrate professional competence within the discipline and serve the needs of the design in mechanical/manufacturing, service, and public sectors of Utah and throughout the nation.

Our Industrial Advisory Board is the primary/key constituency to review of Program Educational Objectives and Student Outcomes in an annual meeting. Any changes will be discussed in the meeting, and any newly approved changes will be documented in the meeting minutes which will be reflected on the program website. Then an annual survey is sent to all PDD-majored students to approve the new changes on Program Educational Objectives and Student Outcomes.

ABET Required Program Educational Objectives

1. Prepare graduates with knowledge, problem solving ability, and hands on skills to enter careers in drafting and basic design of mechanical components and systems.
2. Graduates of associate degree programs shall have competency in drafting, including at least one commercial CAD software package appropriate to the program objectives.
3. Baccalaureate degree graduates are prepared with the knowledge, skills, and abilities to enter careers in applied mechanical design.

C. Student Learning Outcomes

Product Design and Development students will demonstrate:

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems in Product Design and Development Engineering Technology related to applied mechanical design using advanced software tools and techniques.
2. an ability to design systems, components, or processes meeting specified needs for broadly defined engineering problems in Product Design and Development Engineering Technology.
3. an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes
4. an ability to function effectively as a member as well as a leader on technical teams
5. 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.

Additional student outcomes based on ABET accreditation will be the following:

Graduates of associate degree programs must demonstrate knowledge and technical competency appropriate to the objectives of the program in:

(a) engineering materials, applied mechanics, and manufacturing methods.
(b) applied drafting practice emphasizing mechanical components and systems, as well as fundamentals of descriptive geometry, orthographic projection, sectioning, tolerancing and dimensioning, and basic computer aided drafting and design with technical depth in at least one of these areas.
(c) the application of physics and engineering materials having an emphasis in applied mechanics, or in-depth application of physics having emphasis in mechanical components and design.

Graduates of baccalaureate degree programs, in addition to outcomes required of associate degree graduates, must demonstrate competency in the application of manuals, handbooks, material and/or equipment specifications, and related software in advanced drafting/design. Competency in the application of current codes and standards must be demonstrated with open-ended design experiences that integrate materials, manufacturing, design analysis, or graphics. Understanding of concepts relating to the environmental and economic impacts of design must also be demonstrated. Graduates must also demonstrate competency in:

(d) design of machine elements, advanced drafting including current three-dimensional computer representations as related to mechanical design, and manufacturing methods. Advanced proficiency must be demonstrated in at least three drafting / design related areas, consistent with the technical orientation of the program.
(e) the in-depth application of physics and engineering materials having emphasis in drafting, manufacturing, and design of mechanical components.

D. Curriculum

I = introduced, R = reinforced, A = assessed

PDD Program Educational					
1. Graduates will be able to address and solve increasingly complex technical problems related to the field of design engineering technology.					
2. Graduates will ne able to make well educated, responsible and ethical decisions that will have a positive impact on their organization and					
3. Graduates will be able to undertake more complex tasks possibly leading to a supervisory role.					
4. Graduates will grow personally and professionally.					
	Student Learning Outcomes				
	1	**2**	**3**	**4**	5
Student Outcomes >>	An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems in Product Design and Development Engineering Technology related to applied mechanical design using advanced software tools and techniques.	An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems in Product Design and Development Engineering Technology.	An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes	An ability to function effectively as a member as well as a leader on technical teams.	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
AAS Courses					
PDD Core Courses in AAS					
PDD 1010	I	I			
PDD 1020	I	I	I	I	
PDD 1160	I	I			
MFET 2150/L	I				
PDD 2460	R				R
PDD 2650	R	R			
MFET 2440/L	I				
PDD Technical Courses Required					
MFET 1210	I				I
MFET 2410	I		I		I
PDD Support Courses Required					

ENGL 1010	I				I
ENGL 2010					R
COMM 1020 HU or COMM 2110 HU GEL	I				R
MATH 1080 QL or MATH 1050 QL and MATH 1060	I				
CHEM 1010 PS	I				
PHYS 2010 PS	I				
LIBS 1704					R
Creative Arts					R
Social Science					R
American Institutions (AI)					R
PDD Technical Electives (2 credit hours minimum)					
EET 1110	I				
EET 1140	I				
EET 1850	I	I			
PDD 2830	I			R	R
MFET 2670/L	I	R	R	R	R
MET 1000	I				
MFET 2860	I		R	R	R
MFET 2870	I	R			
BS Courses					
PDD Core Courses in BS					
MET 3150	I				
PDD 3100	I	I			
PDD 3300	R	R			
PDD 3460	R	R			
PDD 3470	R	R			R
MFET 3710/L	I	R		R	R
PDD 4200	R	R			
PDD 4470	R	R			R
PDD 4500	R	R			
PDD Technical Support Courses Required					
MFET 2310	I				

MFET 2320	I				
MET 3400	R/A	R			
MFET 3550	I			R/A	R/A
MFET 3620	R			R	R
MFET 4610	I/R/A	R/A	R	R/A	R/A
MFET 4610L	R/A	R/A	R/A	R/A	R/A
MFET 4620L	R/A	R/A	R/A	R/A	R/A
MFET 4995	R/A		R/A		
PDD Technical Electives (6 credit hours minimum)					
PDD 3400	I	I	I		I
PDD 4400	R	R	R		R
PDD 4830	R			R	R
PDD 4890 INT	R			R	R
MFET 3340/L	I	R		R	R
MFET 3350/L	I			R	R
MFET 3460/L	R	R		R	R
MSE 3850	I		R	R	R
PS 3250	R			R	R
EET 3040	R	R	R	R	R
PDD Support Courses Required					
Humanities Electives	I			R	R
Life Science Electives	I			R	R
I = introduced					
R = reinforced					
A = assessed					

"X" indicates the course where this objective (ABET) is taught.

(a) engineering materials, applied mechanics, and manufacturing methods.
(b) applied drafting practice emphasizing mechanical components and systems, as well as fundamentals of descriptive geometry, orthographic projection, sectioning, tolerancing and dimensioning, and basic computer aided drafting and design with technical depth in at least one of these areas.
(c) the application of physics and engineering materials having an emphasis in applied mechanics, or in-depth application of physics having emphasis in mechanical components and design.

(d) design of machine elements, advanced drafting including current three-dimensional computer representations as related to mechanical design, and manufacturing methods. Advanced proficiency must be demonstrated in at least three drafting / design related areas, consistent with the technical orientation of the program.

(e) the in-depth application of physics and engineering materials having emphasis in drafting, manufacturing, and design of mechanical components.

	ABET Learning Outcomes							
Core Courses in Department/Program	a	b	c	d	e			
PDD 1010: Intro to Engineering & Technical Design		x						
PDD 1020: Introduction to 2D CAD Software		x						
PDD 1160: Geometric Dim and Tolerancing		x						
PDD 2460: Product Design Fundamentals		x						
PDD 2650: Product Design and Development		x	x		x			
PDD 3100: Tool Design		x						
PDD 3300: Applied Kinematic Analysis		x						
PDD 3460: Parametric Design Graphics		x		x				
PDD 3470: Introduction to Catia V5		x		x				
PDD 4200: Advanced Mechanical Design		x		x				
PDD 4470: Advanced Catia V5		x		x				
PDD 4500: Hydraulic and Pneumatic Applications		x						
MFET 1210: Machining Principles	x	x						
MFET 2150: Metal Forming, Casting, & Welding	x	x		x				
MFET 2310: Statics for Engineering Technology		x			x			
MFET 2320: Mechanics of Materials		x			x			
MFET 2410: Quality Concepts & Statistical Appl		x	x		x			
MFET 2440: CNC in Manufacturing		x		x	x			
MET 3150: Engineering Technology Materials	x							
MET 3400: Machine Design				x				
MFET 3550: Manufacturing Supervision	x	x	x	x	x			
MFET 3620: Senior Capstone Project Planning								
MFET 3710: CAM and Rapid Prototyping	x	x	x	x	x			

Core Courses in Department/Program	ABET Learning Outcomes							
	a	b	c	d	e			
MFET 4610: Senior Project Planning & Estimating		x						
MFET 4610L: Senior Project Lab	x	x		x	x			
MFET 4620L: Senior Project Lab	x	x		x	x			
MFET 4995: Certified Manufacturing Technologist (CMfgT) Exam Review								

E. Assessment Plan and F. Report

Some items are still in work and waiting for the results from MFET courses.

Student Outcome	Method of Measurement	Responsible Party & Timing	Threshold	Findings Linked to Outcomes	Interpretation of Findings	Action Plan Responsible Party
1. An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems in Product Design and Development Engineering Technology related to applied mechanical design using advanced software tools and techniques.	1. MFET 4995 SME Certification Exam; sections 1.1Mathematics, 1.2.1Applied Engineering Systems; SI 1.3 Materials Applications 2.1Product Design & Development 3.1 Mfg Process Applications and Operations 8.1Personal Effectiveness (only sections relevant to the outcome being assessed are used for assessment)	Orr – Fall Sem. Tobin – Spring Sem. Orr will summarize assessment yearly for PC	Math (section 1.1); 50% Applied & Eng Science 1 SI system (section 1.2.1); 50% Materials (section 1.3); 60% Product Design and Development (Section 2.1); 60% Manufacturing Process & Ops (section 3.1); 50% Personal Effectiveness (section 8.1) 60%)	Fall 2020 (10 students) 1.1 67.5% 1.2.1 50% 1.3 65% 2.1 67.9% 3.1 65.3% 8.1 62.7%	Fall 2020 All thresholds passed	Build data to confirm benchmark – R. Orr, M. Usui
	2. MFET 4610L and MFET 4620 L Evaluations per Rubric SP1-4	Rubric; Resp.: SP1 – MFET 4610 Instructor SP2 Proj. Adv. SP3 Proj. Adv. SP4 All MFET Faculty	75% of projects will score at or above 80% or 8 out of 10	Overall, 7/8 or 87.5% of projects scored above 80% SP1;3 of 4 (75%) scored above 80%. Avg 84% SP2 – 75% scored above 80% SP3 average 92%. 32 of 39 evals were above 80%	Overall - pass SP1; fail. Although the average was fine, one team performed lower than expected. SP2; Fail SP3; pass	R. Orr to review pres. expectations in MFET 4610 in Spring 2021/Fall 2021. done Results in Spring 2021 still showed averages fine but two teams were below benchmarks, Students in two teams were given incompletes and asked to work summer semester to redo drawings, documentation packages and

				SP4 avg = 84.9%. 5 of 8 or 63% > 80%	SP4; fail. Three teams did poorly on presentation.	presentations. Teams passed second try Faculty felt this was assignable to two specific teams rather than systemic. Discuss whether or not to use a simple average number for the benchmark rather than 75% >80
Student Outcome	Method of Measurement	Responsible Party & Timing	Threshold	Findings Linked to Outcomes	Interpretation of Findings	Action Plan Responsible Party
2. An ability to design systems, components, or processes meeting specified needs for broadly defined engineering problems in Product Design and Development Engineering Technology	1. SME exam section 2.1 Product Design & Development	Orr – Fall Sem. Tobin – Spring Sem. Orr will summarize assessment yearly for PC All MFET students take the SME exam	Product Design and Development (Section 2.1); 60%	Fall 2020 exam 67.9%	Pass	N/A
	2. MFET 4610L and MFET 4620L Evaluations per Rubrics SP1-SP4	Rubric; Resp.: SP1 – MFET 4610 Instructor SP2 Proj. Adv. SP3 Proj. Adv. SP4 All MFET Faculty All each semester	75% of projects will score at or above 80%	Overall 7/8 or 87.5% of projects scored above 80% SP1;3 of 4 (75%) scored above 80%. Avg 84% SP2 – 75% scored above 80% SP3 average 92%. 32 of 39 evals were above 80% SP4 avg = 84.9%. 5 of 8 or 63% > 80%	Overall - pass SP1; fail. Although the average was fine, one team performed lower than expected. SP2; Fail SP3; pass SP4; fail. Three teams did poorly on presentation.	R. Orr to review pres. expectations in MFET 4610 in Spring 2021/Fall 2021. done Results in Spring 2021 still showed averages fine but two teams were below benchmarks, Students in two teams were given incompletes and asked to work summer semester to redo drawings, documentation packages and presentations. Teams passed second try Faculty felt this was assignable to two specific teams rather than systemic. Discuss whether or not to use a simple average number for the

						benchmark rather than 75% >80

Student Outcome	Method of Measurement	Responsible Party & Timing	Threshold	Findings Linked to Outcomes	Interpretation of Findings	Action Plan Responsible Party
3. An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes.	1. CSWA Certification Exam	PDD 2460 Instructor. Instructor each semester will forward to the Prog. Coord. Who will summarize assessment yearly	70% of participants pass.	CSWA was given in Spring 2021. Three PDD students took the exam and in PDD 2460 and two students passed.	66% has passed.	Did not reach the goal. We need to have students ready for the exam by giving them some practice exams M. Usui
	2.CSWP Certification Exam	PDD 2650 Instructor. Instructor in Spring semester will forward to the Prog. Coord. Who will summarize assessment yearly	70% of participants pass.	One PDD student took the exam in Spring 2021. He passed.	100%	No action.
	3. SME Certification Exam Section 10	MFET 4995 Instructor. Instructors each semester; will forward to the Prog. Coord. who will summarize assessment yearly	60% of total items seen are passed	No date yet received.	N/A	Waiting for the result from MFET 4995 professor
Student Outcome	Method of Measurement	Responsible Party & Timing	Threshold	Findings Linked to Outcomes	Interpretation of Findings	Action Plan Responsible Party
4. An ability to function effectively as a member as well as a leader on technical teams	MFET 4610L and MFET 4620L Rubric SP3 Individual Evaluation	Project Advisor Assessment is done each semester	75% of students will score 85% or higher	SP3 average 92%. 32 of 39 evals were above 80%	SP3; pass	N/A
	MFET 3550 Exam on teams	MFET 3550 Instructor Evaluated yearly (fall) with Chi Tester	50% of students will pass at a score of 60% or higher	Over 75% of students scored above the threshold	Pass	N/A

Student Outcome	Method of Measurement	Responsible Party & Timing	Threshold	Findings Linked to Outcomes	Interpretation of Findings	Action Plan Responsible Party
5.an ability to apply written, oral and graphical communication in both technical, nontechnical and relevant financial environments: and an ability to identify and use appropriate technical literature.	1. MFET 4610 Senior Project Rubrics SP1 and SP4	MFET 4610 Instructor each semester	75% of papers will score at least a 75%	SP1;3 of 4 (75%) scored above 80%. Avg 84% SP4 avg = 84.9%. 5 of 8 or 63% > 80%	SP1; fail. Although the average was fine, one team performed lower than expected. SP4; fail. Three teams did poorly on the presentation.	R. Orr to review pres. expectations in MFET 4610 in Spring 2021. done Results in Spring 2021 still showed averages fine but two teams were below benchmarks, Students in two teams were given incompletes and asked to work summer semester to redo drawings, documentation packages and presentations. Teams passed second try Faculty felt this was assignable to two specific teams rather than systemic.
	2. 3550 Semester Paper (nontechnical)	MFET 3550 Instructors Assessment each semester, submitted to PC	75% of papers will score at least a 75%	94% of students scored above 75%	Pass	N/A

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
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)		
Full-time Tenured	1	1
Full-time Non-Tenured (includes tenure-track)	0	0
Part-time and adjunct	0	0
With Master's Degrees		
Full-time Tenured	1	1
Full-time Non-Tenured	0	0
Part-time and adjunct	1	1
With Bachelor's Degrees		
Full-time Tenured	0	0
Full-time Non-tenured	0	0
Part-time and adjunct	1	1
Other		
Full-time Tenured	0	0
Full-time Non-tenured	0	0
Part-time	0	0
Total Headcount Faculty		
Full-time Tenured	2	2
Full-time Non-tenured	0	0
Part-time	2	2

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:
    a. Any first-year students taking courses in your program(s).

    We have academic advisors and staff members who work hard to encourage new students to attend the orientation before school starts. It is mandatory but some students still ignore their emails, flyers, and letters. We also encourage students to take the first-year college course to learn how to be successful college students.

    b. Students declared in your program(s), whether they are taking courses in your program(s)

    Academic advisors and program coordinators meet those students and help them plan which courses to take to graduate. Students can make appointments with us so that we can sit down and look at their Cattracks and see what they must do. We also return to their emails and phone calls.

2) 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'.

    We will use the certification exam as an assessment tool to see if students are improving their skills. Based on the result, if we don't see any improvement, we will discuss and change the course materials and contents.