

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 Product Design and Development (PDD) program used to be Design Engineering Technology. Now it is offered under the Department of Manufacturing and Systems Engineering. 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.

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. effective technical communication skills, including written, oral and graphical
2. have obtained the requisite knowledge and have acquired the technical skills to be successful in the discipline.
3. the ability to function as a member of a project team.
4. problem solving skills related to the discipline.
5. knowledge of the national standards used in the discipline and the ability to apply national standards in the development of design documentation and graphics presentations.

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

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

1. effective technical communication skills, including written, oral and graphical
2. have obtained the requisite knowledge and have acquired the technical skills to be successful in the discipline.
3. the ability to function as a member of a project team.
4. problem solving skills related to the discipline.
5. knowledge of the national standards used in the discipline and the ability to apply national standards in the development of design documentation and graphics presentations.

	Program Learning Outcomes							
	Learning Outcome 1	Learning Outcome 2	Learning Outcome 3	Learning Outcome 4	Learning Outcome 5			
Core Courses in Department/Program								
PDD 1010: Intro to Engineering & Technical Design		x		x	x			
PDD 1160: Geometric Dim and Tolerancing		x		x	x			
PDD 2460: Product Design Fundamentals	x	x	x	x	x			
PDD 2650: Product Design and Development		x		x	x			
PDD 3100: Tool Design	x	x		x	x			
PDD 3300: Applied Kinematic Analysis	x	x		x	x			
PDD 3400: Rendering Basics		x	x	x	x			
PDD 3460: Parametric Design Graphics		x	x	x	x			
PDD 3470: Introduction to Catia V5		x		x	x			
PDD 4400: Animation Basics	x	x		x	x			
PDD 4470: Advanced Catia V5		x		x	x			
PDD 4500: Hydraulic and Pneumatic Applications		x	x	x	x			
PDD 4600: Senior Project I (Design)	x	x	x	x	x			
PDD 4610: Senior Project II (Build)	x	x	x	x	x			
ART 1100: Drawing I	x			x				
ART 1120: Design Concepts	x			x				
MFET 1210: Machining Principles	x	x		x				
MFET 2150: Metal Forming, Casting, & Welding		x		x	x			
MFET 2310: Statics for Engineering Technology	x	x		x				
MFET 2320: Mechanics of Materials	x	x		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		x	x			
MET 3400: Machine Design	x	x		x	x			
MFET 3550: Manufacturing Supervision	x	x		x	x			
MFET 3710: CAM and Rapid Prototyping	x	x	x	x	x			
MFET 4610: Senior Project Planning & Estimating	x	x	x	x	x			

"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							
	a	b	c	d	e			
Core Courses in Department/Program								
PDD 1010: Intro to Engineering & Technical Design		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 3400: Rendering Basics		x						
PDD 3460: Parametric Design Graphics		x		x				
PDD 3470: Introduction to Catia V5		x		x				
PDD 4400: Animation Basics		x						
PDD 4470: Advanced Catia V5		x		x				
PDD 4500: Hydraulic and Pneumatic Applications		x						
PDD 4600: Senior Project I (Design)		x						
PDD 4610: Senior Project II (Build)		x						
ART 1100: Drawing I								
ART 1120: Design Concepts	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								
MET 3150: Engineering Technology Materials	x							
MET 3400: Machine Design				x				
MFET 3550: Manufacturing Supervision	x	x	x	x	x			
MFET 3710: CAM and Rapid Prototyping	x	x	x	x	x			
MFET 4610: Senior Project Planning & Estimating		x						

E. Assessment Plan and F. Report

Due to the program name change, we had a site visit with ABET on September 30th, 2019. Based on their review, our weaknesses are solved. The final result of this evaluation will be released in July 2020.

Preplanned agenda items for systematic review of Program Educational Objectives (PEOs – ABET requirements)

Spring 2020 and Fall 2020: CSWA certification exam will be required in PDD 2460 to assess students' continuous improvement in SolidWorks skills and understanding.

Spring 2020: CSWP certification exam will be required in PDD 2650 to assess students' continuous improvement in SolidWorks advanced skills and understanding.

Student learning outcomes are related to PEOs and will be assessed routinely every year. They are reported to the Industrial Advisory Committee and PDD faculty and the MSE Department Chair. Supporting material for the assessment will be stored by the Program Coordinator. All metric assessment data will be stored for six years (relevant to the next ABET review cycle). Classroom artifacts that support curriculum requirements for ABET will be collected the year prior to ABET assessment, or as requested for regional accreditation.

