

BI 0804 - RAPID PROTOTYPING FOR PRODUCT DESIGN

Catalog Description

Formerly known as CET 804

Hours: 18 (9 lecture, 9 laboratory)

Description: Hands-on exposure to processes used to fabricate prototypes. An introduction to tools and technologies for prototyping, including design for manufacture. Example products show the process from idea to market including the series of prototypes that helped get the product to successful sales. Course materials cover safe hand tool use, power woodworking hand tools, wood shop tools, laser cutting, and CNC routers. (pass/no pass grading) (noncredit)

Course Student Learning Outcomes

- CSLO #1: Demonstrate proper handling of materials and equipment set-up to maintain safe working procedures.
- CSLO #2: Produce drawings and symbols to create model of product.
- CSLO #3: Design prototype components and fabricate viable product.

Effective Term

Fall 2020

Course Type

Noncredit

Contact Hours

18

Outside of Class Hours

9

Total Student Learning Hours

27

Course Objectives

Lecture Objectives:

1. Identify and explain safe handling of tools and machinery.
2. Explain measurement and tolerances
3. Describe proper care and maintenance of tools and machinery.
4. Describe prototyping processes.
5. Discuss proper use of design software.
6. Describe material selections.
7. Appraise CNC software and operations.

Laboratory Objectives:

1. Demonstrate tape measure fluency.
2. Measure basic geometric shapes used in product design.
3. Examine and interpret drawings and symbols used in product design.
4. Solve arithmetic functions.
5. Demonstrate safe use of the laser cutter.
6. Demonstrate the ability to rapid prototype.
7. Create spreadsheets of parts and processes.

8. Document the rapid prototyping process of a new product.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

Methods of Evaluation

- Problem Solving Examinations
 - Example: Students will be tested on reading and lecture material. Question Example: Describe the hazards and mitigation for each, when setting up the laser cutter for use. Points will be assigned to each question and converted to a letter grade.
- Projects
 - Example: Student projects will be graded according to completeness and adherence project drawings. The grading is determined by a grading rubric.

Repeatable

Yes

Methods of Instruction

- Laboratory
- Lecture/Discussion

Lab:

1. Lab techniques will be presented in a "describe / show / review" methodology. Students will complete a safety test before using equipment and laser cutter. Instructor will work with students until they can successfully complete the test with 100% success rate. (Lab Objective 5)

Lecture:

1. Instructor will demonstrate proper handling of materials and equipment set-up in various methods of prototyping production. The student will be given an opportunity to clarify any questions in an instructor-guided discussion. (Lecture Objective 3)

Typical Out of Class Assignments

Reading Assignments

1. Read text unit on machine and tool operations safety. Be prepared to pass a safety test. 2. Read the text units on prototyping technologies. Be prepared to discuss and apply material.

Writing, Problem Solving or Performance

1. Demonstrate proper hand and power tool safety operation. Instructor will evaluate student performance using a safety rubric. 2. Lab Assignments: Construct an assigned prototyping project with the assigned tools.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Make: Technology on your time Volume 40: New Maker Tools
 - Author: Mark Frauenfelder
 - Publisher: Maker Media
 - Publication Date: 2014
 - Text Edition: 1st
 - Classic Textbook?: No
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

Safety glasses, hearing protection, tape measure, notebooks.