ADVM 0062 - INTRODUCTION TO COMPUTER AIDED DESIGN AND MANUFACTURING (CAD/CAM)

Catalog Description

Hours: 81 (27 lecture, 54 laboratory)
Description: Introduction to CAD/CAM using Fusion 360. Covers practical on-the-job skills needed for precision machining. Students will learn skills needed to read and understand detailed drawings, create a process plan for machining parts, create 3D CAD files from 2D drawings, create 2D drawings from 3D models, plan and create CNC toolpaths and export G-code for manufacturing. (not transferable)

Course Student Learning Outcomes

- CSLO #1: Demonstrate safety standards for both a learning lab environment and worksite environment for metal working including cutting, machining, forming and assembly.
- CSLO #2: Apply the terms used in this industry: chip hook, coolant, geometric control, burrs, height gage, indicators, toolpath and clearance.
- CSLO #3: Operate various types of machines in performance of construction of assigned project(s).

Effective Term

Fall 2021

Course Type

Credit - Degree-applicable

Contact Hours

81

Outside of Class Hours

54

Total Student Learning Hours

135

Course Objectives

Lecture:
1. Differentiate additive vs subtractive manufacturing.
2. Create CAD drawings to render assigned project.
3. Develop a strategy of operations for projects using computer assisted programming.
4. Analyze and compare CAD specifications with completed part geometry and provide logical recommendations for corrections.
Laboratory:
1. Demonstrate machine set-up and operation using created design.
2. Execute tool path operation to complete part.
3. Perform secondary offload operations and assembly.

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

- Classroom Discussions
  - Example: Class discussion on parametric modeling. Students will be evaluated on participation.
- Projects
  - Example: Students will be evaluated on designing a 3D model using CAD software. Example: Reverse engineering of a hard jaw.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. The instructor will demonstrate how to align the vise to the X & Y axis of the milling machine, followed by the student demonstrating the process safely.

Lecture:

1. Instructor lecture on creation of CAD drawings followed by students outlining the steps to creating a CAD drawing.

Typical Out of Class Assignments
Reading Assignments

1. Read chapter from text on understanding chip development of central focus point called interference contact. (IX - rake, clearance, cutting angles). Be prepared to discuss in class. 2. Read chapter measurement and be able to identify three methods to measure the 1.75 inch diameter hole within 0.0005 tolerance. (XIII - Inspection methods).

Writing, Problem Solving or Performance

1. Experiment #1: Using modeling clay, try varying the rake angle comparing positive rake vs negative rake. (XI - define the shear line in a chip). 2. Machine center holding tooling, identify fixture and material holding.

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

- Machining and CNC Technology
  - Author: Fitzpatrick, Smith
  - Publisher: McGraw Hill
  - Publication Date: 2019

- Text Edition: 4th
- Classic Textbook?:
- OER Link:
- OER:

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