ADVM 0005C - CNC MILLING LEVEL 1

Catalog Description

Formerly known as ADVM 0066
Prerequisite: Completion of ADVM 0002B and ADVM 0005B with grade of "C" or better or equivalent as determined by instructor
Hours: 72 (18 lecture, 54 laboratory)
Description: Intermediate course making machined parts from start to finish using Computer Numerical Controlled (CNC) vertical milling machines. Students will learn how to program three-axis CNC toolpaths using Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) software, set up tools and work holding using Wireless Intuitive Probing System (WIPS), and run their programs on CNC vertical machining centers. After machining the parts, students will use common industry measuring and inspection techniques to ensure their parts are in tolerance. (not transferable)

Course Student Learning Outcomes

- CSLO #1: Demonstrate safety standards for both a learning lab environment and worksite environment of a CNC Machine Shop lab.
- CSLO #2: Apply the terms used in this industry: X-Y-Z Axis, tool offsets, work offsets, linear interpolation motion, circular interpolation motion, cutter compensation, toolpath, and dryrun operation.
- CSLO #3: Use CNC machine for the the assigned project(s).

Effective Term

Fall 2026

Course Type

Credit - Degree-applicable

Contact Hours

72

Outside of Class Hours

36

Total Student Learning Hours

108

Course Objectives

Lecture:

1. Define machine operation procedure for safely proving out first article parts
2. Compare Types of cuts, rough, finish, pocket, and chamfer.
3. Explain drilling cycles and tapping cycles.
4. Determine feed rate, spindle speed, lead in/out.
5. Modeling a part and creating a tool path.
6. Outline Haas Intuitive Programming process.

Laboratory:

1. Apply safety processes used to operate Computer Numerical Controlled (CNC) milling machining.
2. Apply Vertical Mill operation.
3. Load and set cutting tools using the WIPS.
4. Practice locating work using the WIPS.
5. Demonstrate machine assignments that were created using CAD/CAM
6. Perform different types of cuts.
7. Proof a program by machining parts and validating specifications with measurement tools.
8. Practice Haas Intuitive Programming

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

- Objective Examinations
  - Example: Students will take a multiple-choice test on each major topic area in CNC Mill application. Standard Grading. Example Question: The Z-direction is: a. left to right, right to left, b. forward backward, backward forward, c. up down or down up, d. none of the above.
- Projects
  - Example: The instructor-assigned student projects are evaluated to industry standards through the use of performance rubrics. Example: Comparison of blueprint to finished project part.
- Skill Demonstrations
  - Example: The instructor will use student skill demonstrations to evaluate student performance to industry standards as an entry level CNC operator. Example: Student will demonstrate work off-set on vertical mill.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. Instructor demonstrates how to set up the Haas milling machine, followed by the students safety demonstrating how to perform the set-up.

Lecture:

1. Instructor lecture on fundamental technical sciences integrated with applied technical areas (such as engineering materials and mechanics), to successfully apply the analytical techniques (and problem-solving skills) needed. Student will distinguish production steps needed to program code to perform machine operations.

Distance Learning

1. Following a brief intro video and reading assignment describing the difference between “climb milling” and “conventional milling”; the students shall discuss this subject in a discussion board both with the instructor and other students within the class.

Typical Out of Class Assignments
Reading Assignments

1. Students read the safety section from the text book and be prepared to discuss in class. 2. Students are required to read chapter on measurements and complete the review questions at the end of the chapter.

Writing, Problem Solving or Performance

1. Students will complete an assigned project that meets the criteria and specifications outlined. Example: Tighten 1M and 2M parts. 2. The student will track their project's time expenditures and materials in order to complete the job costing component requirement of this course.

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

- Precision Machining Technology
  - Author: Peter J. Hoffman
  - Publisher: Cengage Learning
  - Publication Date: 2020
  - Text Edition: 3rd
  - Classic Textbook?:
  - OER Link:
  - OER:
- Workbook and Projects Manual for Precision Machining Technology
  - Author: James Hellwig
  - Publisher: Cengage Learning
  - Publication Date: 2020
  - Text Edition: 3rd
  - Classic Textbook?:
  - OER Link:
  - OER:
- NIMS Level 1
  - Author: Andrew Klein
  - Publisher: Cengage Learning
  - Publication Date: 2017
  - Text Edition:
  - Classic Textbook?:
  - OER Link:
  - OER:
- Machining and CNC Technology
  - Author: Fitzpatrick and Smith
  - Publisher: McGraw Hill
  - Publication Date: 2024
  - Text Edition:
  - Classic Textbook?:
  - OER Link:
  - OER:

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