MACH A125: CNC MACHINE OPERATION 1

Item	Value
Curriculum Committee Approval Date	10/06/2021
Top Code	095630 - Machining and Machine Tools
Units	3 Total Units
Hours	90 Total Hours (Lecture Hours 36; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

A basic course in the operation of computerized numerically controlled lathes and mills, including machine functions, tooling setup, reading machine language, part setup, and machine manipulation. Includes production of parts on both lathes and mills. ADVISORY: MACH A105 and MACH A110. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Properly set up and operate a CNC milling machine and CNC lathe.
2. Upload and download programs for CNC mills and lathes.
3. Perform offsets on tools to maintain blueprint dimensions.

Course Objectives

- 1. Define and describe CNC machine control capabilities.
- 2. Demonstrate proper CNC tooling set up.
- 3. Apply proper procedures to accurately make offset changes to correct part diameter.
- 4. Apply proper procedures to accurately make offset changes to correct part length.
- 5. Demonstrate the process of program editing in the memory of the CNC machine.
- 6. Demonstrate the process of loading a new program into the machine.

Lecture Content

Orientation of Computerized Numerical Control Machines Definition History Types of Computerized Numerical Control Machines CNC machine control capabilities Manual Tape controlling Tool offset features Tooling setup Standard tool holder styles Gage length usage Tool geometry of basic tooling CNC paperwork for the operator Reading a program print out Tooling drawings Machine setup Setup point selection Depth stops Tool position Clamping Tape usage Storage Care Insertion to the machine Proper steps of machine operation Tooling setup Machine setup Part setup Part verification Problems in CNC machine operation Correctly locate and use the following machine controls: Emergency stop Slide hold Cycle stop Optional stop Feed rate override Block delete Zero return Accurately send the machine to the machine zero position. Recognize where part zero is located on a variety of part programs. Recognize common conditions of tool wear on a CNC machine.

Lab Content

A. CNC machine control capabilities. B. Tooling setup. C. Machine setup. D. Reading a program print out. E. Proper steps of machine operation. F. Accurately send the machine to the machine zero position. G. Recognize where part zero is located on a variety of part programs. H. Recognize common conditions of tool wear on a CNC machine. I. Reading and writting an accurate program to run on the CNC Machine.

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

Instructional Techniques

Lecture, demonstration, and laboratory activity on both CNC lathes and CNC mills

Reading Assignments

Students will be given handouts as study guides. Approximately 1 hour per week.

Writing Assignments

Students will answer short quizzes and exams. They will also describe the meaning of machine language CNC programs. Performing arithmetic calculations as assigned, including geometric layouts of machined parts. 1.5 hours per week

Out-of-class Assignments

Students will write manual CNC programs in preparation for running the programs on the machine. Approximately 2 hour per week.

Demonstration of Critical Thinking

Midterm, final exam, and weekly project assignments

Required Writing, Problem Solving, Skills Demonstration

Students will answer short quizzes and exams. They will also describe the meaning of machine language CNC programs.

Eligible Disciplines

Machine tool technology (tool and die making): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Haas Automation Inc.. CNC Lathe and Mill Operator?s Manual,, latest ed. Oxnard: Haas Automation Inc., 2020 Rationale: -