MACH A126: CNC MACHINE OPERATION 2

Item	Value
Curriculum Committee Approval Date	10/06/2021
Top Code	095630 - Machining and Machine Tools
Units	2 Total Units
Hours	72 Total Hours (Lecture Hours 18; 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

Students will learn advanced features of state-of-the-art CNC lathes and mills, make their own fixtures, write the necessary programs, and produce the parts on CNC machines. ADVISORY: MACH A125 or instructor approval. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Demonstrate the process of loading programs from a computer to the memory of the machines.
2. Use the machine to prove out a program without first making the part.
3. Produce basic and complex parts on both CNC Lathes and Mills.

Course Objectives

- 1. Describe the process to produce basic and complex parts on both CNC Lathes and Mills
- 2. Make complete part and tool setups without assistance.
- 3. Write programs that use the common autocycles for state of the art CNC Lathes and Mills.
- 4. Correctly edit programs in memory.
- 5. Accurately locate multiple zero positions.
- 6. Demonstrate the ability to adjust speeds and feeds during a program run to optimal cutting conditions.
- 7. Explain the process of loading programs from a computer to the memory of the machines.
- 8. Describe the process of using the machine to prove out a program without first making the part.

Lecture Content

Review of CNC machine fundamentals Overview of state of the art machine features Machining center zero techniques Cold start vs machine zero Part zero procedures Program zero options Turning center zero techniques Work shifts Geometry offsets Wear offsets Tool length offset procedures on a machining center Standard method using DT command Using the SL, command Using the UT command Methods of using fixture offsets Using advanced autocycles for: Bolt circles Pockets Lettering Threading Drilling Rough turning

Lab Content

CNC machine control capabilities. Tooling setup. Machine setup. Reading a program print out. Proper steps of machine operation. 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. 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 mills

Reading Assignments

Students will be given handouts as study guides. Approximately .25 hour per week.

Writing Assignments

Students will write short answer to quizzes and define certain types of machine language codes. 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 hours per week.

Out-of-class Assignments

Students will write manual CNC programs in preparation for running the programs on the machine. Approximately 1 hour per week.

Demonstration of Critical Thinking

Mid term, lab assignments, final project

Required Writing, Problem Solving, Skills Demonstration

Students will write short answer to quizzes and define certain types of machine language codes

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 Handbook, latest ed. Oxnard: Haas Automation Inc., 2020 Rationale: -