MACH 2633: CNC Precision Machining Mill

A. COURSE DESCRIPTION

Credits: 4
Lecture Hours/Week: 1
Lab Hours/Week: 6
OJT Hours/Week: *.*

Prerequisites:
This course requires all 10 of these prerequisite categories
1. CMAE 1510 - Print Reading
   And
2. MACH 1601 - Introduction to Precision Machining
   And
3. MACH 1610 - Precision Measuring and Gauging
   And
4. MACH 1615 - Precision Machining Processes
   And
5. MACH 1625 - Engineering Drawings 2
   And
6. MACH 1630 - Introduction to CNC Theory
   And
7. MACH 1642 - CNC Operations 1
   And
8. MACH 1643 - CNC Operations 2
   And
9. MACH 1650 - Introduction to EDM
   And
10. One of these two
    MACH 1661 - Introduction to CAD/CAM
    MACH 1662 - Introduction to CAD/CAM + 3D Printing

Corequisites: None
MnTC Goals: None

This course will focus on CNC Machining Center operations used to support metal stamping die making, injection mold making, & Production Machining projects. Each student will manufacture several example parts in this course. The student will be responsible for the programming, machine set-up, machining, production & inspection. The finished project must produce an accurate part according to the print tolerances. (Prerequisites: CMAE1510, MACH1601, MACH1610, MACH1615, MACH1625, MACH1630, MACH1642, MACH1643, MACH1650, and MACH1661 or MACH 1662 or equivalent. (4 Credits: 1 lecture/3 lab)

B. COURSE EFFECTIVE DATES: 01/27/2016 - Present
C. OUTLINE OF MAJOR CONTENT AREAS
1. Safety and set-up for CNC Mills.
2. Learn & Apply G & M code programming.
3. Learn & Apply Conversational programming.
4. Develop Proficiency in CNC Mill operations.
5. Apply machining formulas & reference materials.
6. Practice precision measuring and inspection methods.
7. Develop 5-S program skills.

D. LEARNING OUTCOMES (General)
1. Identify safety rules for operating machinery, including proper eye wear and clothing.
2. Use CAD & CAM system to design and program project features.
3. Demonstrate proper tool set-up, and Tool Touch-off data input on CNC Mills.
4. Demonstrate knowledge of insert selection data for Mill cutters.
5. Demonstrate competency as a CNC Mill operator.
6. Demonstrate proper selection and accurate use of precision measuring tools for Inspections.
9. Understand and apply the following G-codes for Milling: G00, G01, G02, G03, G04, G28, G40, G41, G42, G43, G54, G55, G56, G57, G58, G59, G73, G74, G80, G81, G82, G83, G84, G90, G91, G98, G99
10. Understand and apply the following M-codes for Milling: M00, M01, M2, M3, M4, M5, M6, M8, M9, M19, M30, M98, M99
11. Apply the G & M-codes in hand written MDI (MANUAL DATA INPUT) programs to machine course projects.
12. Demonstrate how to "Edit" an existing Program at the Machine Control.
13. Perform transfer and loading of programs from a computer to the machine control.
14. Demonstrate the ability to successfully create a Conversation program.
15. Show an ability to navigate the different "screens" on CNC Mills.
16. Clean and lubricate all machines (5-S PROGRAM).

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies
None

F. LEARNER OUTCOMES ASSESSMENT
As noted on course syllabus

G. SPECIAL INFORMATION
None noted