Course Name: Advanced Computerized Numerical Control  
Course Number: MFG 312 FD01  
Course Department: Industrial Technology  
Course Term: Spring 2020  
Last Revised by Department: 8/19  
Total Semester Hour(s) Credit: 2  

Lecture: 15   Lab: 30   Clinical:   Internship/Practicum: 

Catalog Description:  
Students will learn advanced computerized numerical control programming using a computerized numerical controlled mill. The student will learn to use curve programming, subroutines, canned cycles, CNC threading, and tool difference compensation. 

Pre-requisites and/or Co-requisites:  
MFG 305 CNC Operations 

Textbook(s) Required:  
Manton: Mastercam 2018 Training Guide Mill 2D/Lathe Combo 978-1988766041 

Access Code: None 

Required Materials: Safety Glasses 

Suggested Materials: None 

Course Fees: None 

Institutional Outcomes: 

Critical Thinking: The ability to dissect a multitude of incoming information, sorting the pertinent from the irrelevant, in order to analyze, evaluate, synthesize, or apply the information to a defendable conclusion. 

Effective Communication: Information, thoughts, feelings, attitudes, or beliefs transferred either verbally or nonverbally through a medium in which the intended meaning is clearly and correctly understood by the recipient with the expectation of feedback.
Personal Responsibility: Initiative to consistently meet or exceed stated expectations over time.

Department Outcomes:
1. Enhance our partnerships with local industry to fulfill their employment and training needs.
2. Students will possess the skills needed to be gainfully employed in their chosen career path.
3. Students will demonstrate competency in the skills needed to satisfy their educational goals.

Program Outcomes:
1. Apply basic and advanced skills that are currently required for machine trades or machine trade related industries; engine lathe, vertical milling machines, surface grinders, and supporting metal machining tooling.
2. Generate an understanding and appreciation of current manufacturing technologies and practices.
3. Apply basic skills that are currently required for machine trades or machine trade related industries for application in computer numerical control systems and computer aided drafting applications.
4. Utilize basic and complex computational skills for strengthening higher order thinking skills such as; problem solving, decision making, and critical thinking.
5. Utilize structured problem solving and team building activities during instruction and by means of manufacturing activities.

Student Learning Outcomes:
1. Explain single point threading using CNC lathes
2. Identify the major axes and directions of motion on a typical machining center.
3. Produce CNC programs at the G&M code level and parts to blueprint specifications
4. Utilize canned cycles in a program for a CNC mill.

Course Objectives:
1. Produce a threading program for a lathe.
2. Produce a threaded part to blue print specifications using the CNC lathe.
3. Utilize tool point compensation.
4. Utilize correct speeds and feeds for the type of tool and material being machined.
5. Produce a curve program in coded language for a CNC mill
6. Utilize drilling cycles for drilling holes to blue print specifications
7. Produce a bolt hole pattern using a canned cycle
   a. Produce a contour using a canned cycle

College Procedures: All college-wide procedures are located in the Iowa Central Community College Student Handbook.
Assessments:
G&M code identification   30 points
G&M code Quiz          30 points
Threaded lathe part and program   50 points
Initials program        20 points
Mill Project 1           20 points
Mill Project 2           20 points
Mill Project 3           20 points
Mill Project 4           20 points
Mill Project 5           20 points
Bolt Pattern             20 Points
Cutter compensation program   20 Points
Conversational Program    20 Points
Instructor’s choice project     50 Points
Final Test                200 Points

Please note that assessments are subject to change

Non-discrimination Statement:

If you have questions or complaints related to compliance with this policy, please contact Kim Whitmore, Director of Human Resources, phone number 515-574-1138, whitmore@iowacentral.edu; or the Director of the Office for Civil Rights, U.S. Department of Education, Citigroup Center, 500 W. Madison, Suite 1475, Chicago, IL 60661, phone number 312-730-1560, fax 312-730-1576.

Disability/Accommodation Services:

If you have a request for an accommodation based on the impact of a disability, it is Iowa Central’s policy that you contact the Academic Assistance & Accommodations Coordinator to discuss your specific needs and to provide supporting information and documentation, so we may determine appropriate accommodations. The office for accommodations is located in the Academic Resource Center, and it can be reached by calling 515-574-1045. For online information about accommodations, please go to www.iowacentral.edu/accommodations.
Bias-Free Classroom Statement:

Advanced Computerized Numerical Control maintains high standards of respect in regard to individual beliefs and values when selecting classroom materials including textbooks, project activities, power points, videos, presentations, and classroom discussions.

It is our belief that all people have the right to obtain an education within our department/program courses free of bias, with full respect demonstrated to all who enroll in the courses of this department/program.

External Accreditation: None