MACH 80B Course Outline as of Fall 2013

CATALOG INFORMATION

Dept and Nbr: MACH 80B   Title: INTRO CNC MILL
Full Title: Introduction to Computer Numeric Control Mill
Last Reviewed: 2/28/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	5.00	Lab Scheduled	4.00	6	Lab Scheduled	70.00
		Contact DHR	0		Contact DHR	0
		Contact Total	8.00		Contact Total	140.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00   Total Student Learning Hours: 280.00

Title 5 Category: AA Degree Applicable
Grading: Grade Only
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
Introduction to theoretical and operational characteristics of the CNC (computer numerical control) mill. Integration of computer-aided drafting (CAD), design, and programming for Computer Aided Machining (CAM) of machine parts on the CNC mill. Applicable to entry-level computer numerical control mill operators.

Prerequisites/Corequisites:
Course Completion of MACH 80A

Recommended Preparation:
Course Completion of CS 101A

Limits on Enrollment:

Schedule of Classes Information:
Description: Introduction to theoretical and operational characteristics of the CNC (computer numerical control) mill. Integration of computer-aided drafting (CAD), design, and programming for Computer Aided Machining (CAM) of machine parts on the CNC mill. Applicable to entry-level computer numerical control mill operators. (Grade Only)
Prerequisites/Corequisites: Course Completion of MACH 80A

Recommended: Course Completion of CS 101A
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

			Effective:	Inactive:
AS Degree:	**Area**		Effective:	Inactive:
CSU GE:	**Transfer Area**		Effective:	Inactive:
IGETC:	**Transfer Area**		Effective:	Inactive:
CSU Transfer:	Transferable	Effective: Spring 1995	Inactive:
UC Transfer:		Effective:	Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of this course, the student will be able to:
1. Practice the safe use of tools and machines.
2. Compare and contrast manual and CNC (computer numerical control) mill operations.
3. Relate the theory of CNC mill operation to machining processes.
4. Generate two-dimensional geometric images for CNC mill projects using computer-aided drafting (CAD) software.
5. Using a drafted image, write and interpret code for machining a part on a CNC mill.
6. Troubleshoot code for incorrectly machined parts.
7. Calculate cutting speeds, feeds and tools for various computer numerical control mill operations.
8. Diagnose basic problems faced in the operation of the computer numeric control mill.
9. Students who repeat the course will accomplish mill machining processes utilizing the Master CAM (computer-aided machining) program, a more advanced and powerful computer-aided drafting and machining software that utilizes a post-processor to process code for machining.

Topics and Scope:

I. Introduction
   A. Shop safety
   B. Print reading--working drawings
   C. Shop orientation--machine identification--facility layout
II. Basic Computer Numeric Control Mill operations
   A. Manual vs. CNC (Computer Numeric Control) mill operations
      1. Use
      2. Capabilities
      3. Theoretical and operational characteristics
   B. Computer Numeric Control accessories

C. Cutting tools
    1. Characteristics
    2. Design
    3. Machining parameters
  D. Production methods
III. Materials
  A. Types
  B. Properties
IV. Computer Aided Drafting (CAD) for CNC mill
  A. Design for manufacturing
  B. Generating a two-dimensional image
V. CNC Mill
  A. Computer Numeric Control theory
  B. Writing code (programming) for the CNC mill
    1. Translating a 2-dimensional image into code
    2. Troubleshooting code
  C. Computer Numeric Control operation
  D. Production methods
VI. Other Computer Numeric Control Programs

Assignment:

Representative assignments:
1. Demonstrate proper set-up and operating procedure for the CNC mill
2. Complete CAD exercises and produce 2-dimensional drawings for CNC machining
3. Write code for machining a part from CAD drawings
4. Manufacture projects on the CNC mill from shop drawings
5. Reading, 10-15 pages per week
6. Two to four quizzes; final exam

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

CAD homework problems	Problem solving 20 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances, lab projects, machine setup and breakdown	Skill Demonstrations 30 - 45%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, true/false, matching items, completion	Exams 30 - 40%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Machine Tool Practices, Kibbe, R., Neely, D., and White, W. 9th edition, Prentice Hall, 2010.
Introduction to Computer Numerical Control (CNC), Valentino, James V. and Goldenberg, Joseph. Prentice Hall, 4th edition, 2007.