

MACH 80A Course Outline as of Spring 2021**CATALOG INFORMATION**

Dept and Nbr: MACH 80A Title: CNC MACHINE I

Full Title: Computer Numeric Control Machining I

Last Reviewed: 2/24/2020

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	8	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 Computer Numerical Control (CNC) machine tools. Integration of Computer-Aided Drafting (CAD), design, and programming for Computer Aided Machining (CAM) of machine parts on the CNC machine tools. Applicable to entry-level computer numeric control machine tools operators.

Prerequisites/Corequisites:

Course Completion or Current Enrollment in MACH 51A

Recommended Preparation:

Course Completion of CS 5

Limits on Enrollment:**Schedule of Classes Information:**

Description: Introduction to theoretical and operational characteristics of the Computer Numerical Control (CNC) machine tools. Integration of Computer-Aided Drafting (CAD), design, and programming for Computer Aided Machining (CAM) of machine parts on the CNC machine tools. Applicable to entry-level computer numeric control machine tools operators. (Grade Only)

- II. Basic CNC Operations
 - A. Manual vs. CNC operations
 - 1. Use
 - 2. Capabilities
 - 3. Theoretical and operational characteristics
 - B. CNC Accessories
 - C. Cutting tools
 - 1. Characteristics
 - 2. Design
 - 3. Machining parameters
 - D. Production methods
- III. Materials
 - A. Types
 - B. Properties
- IV. CAD for CNC machines
 - A. Design for manufacturing
 - B. Generating a two-dimensional image
- V. CNC Machining
 - A. CNC theory
 - B. Writing G&M code (programming) for the CNC machines
 - 1. Translating a 2-dimensional image into G&M code
 - 2. Troubleshooting code
 - C. CNC operation
 - D. Production methods
- VI. Other CNC Programs

All topics covered in lecture and lab

Assignment:

Lecture-Related Assignments:

1. Reading, 10-15 pages per week
2. Quizzes; final exam

Lecture- and Lab-Related Assignments:

1. Write G&M code for machining a part from CAD drawing(s)

Lab-Related Assignments:

1. Performance exams: demonstrate proper set-up and operating procedure for the CNC machine
2. Complete CAD exercises and produce 2-dimensional drawings for CNC machining
3. Manufacture projects on the CNC machine from shop drawings

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.

Homework problems

Problem solving
20 - 30%

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

Performance exams, lab projects

Skill Demonstrations
30 - 45%

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

Quizzes; final exam

Exams
30 - 40%

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

Professionalism

Other Category
5 - 10%

Representative Textbooks and Materials:

CNC Programming Handbook. 3rd ed. Smid, Peter. Industrial Press, Inc. 2007 (classic)