



## Course Outline

2026-2027 Catalog

### MFG 20 - Manufacturing Equipment

#### Catalog Description

**Transfer Status:** CSU

**Prerequisite:** MFG 10, MFG 12, MFG 14, MFG 16

**Corequisite:** MFG 22, MFG 24, MFG 26

**Unit(s):** 8.00

**Lecture:** 85.00 Contact hours/170.00 Out of class hours/255.00 Total hours/5.00 Unit(s)

**Lab:** 153.00 Contact hours/0.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

**Total:** 238.00 Contact hours/170.00 Out of class hours/408.00 Total hours/8.00 Unit(s)

**Course Description:** This course is designed to introduce the principals and practices of manufacturing equipment as it relates to advanced manufacturing. Emphasis will be placed on developing safety and operation skills used to operate CNC manufacturing equipment. Students will also learn measuring and trade math, tool selection and identification, equipment types, equipment maintenance, drawings, work orders, quality assurance, feeds, speeds, and pressures. These areas of instruction will be reinforced by hands-on application in several performance lab exercises.

#### Objectives

Upon successful completion of this course, the student should be able to:

1. Practice safety skills that are required on job-sites.
2. Explain the basic principles of feed settings for the CNC Lathe.
3. Describe the importance of proper speed selection when using the CNC Press Brake.
4. Identify the proper punch and die for forming a hem joint on sheet metal.
5. Identify the proper nesting software for the CNC Cutting Table.
6. Convert units of measurement from the inch-pound system to the metric systems, and vice-versa.
7. Use proper terminology and communication skills while presenting how to setup assigned equipment properly.

#### Course Content

##### Topic Titles / Suggested Time Topic

##### Lecture

| <u>Topics</u>                               | <u>Lec Hrs</u> |
|---------------------------------------------|----------------|
| Introduction and Safety                     | 5.00           |
| CNC Mill                                    | 7.00           |
| CNC Lathe                                   | 7.00           |
| CNC Press Brake                             | 7.00           |
| CNC Cutting Table                           | 7.00           |
| Measuring and Applied Trade Math            | 6.00           |
| Communication Skills                        | 6.00           |
| Tooling I.D. and Selection                  | 6.00           |
| Types of Materials                          | 6.00           |
| Types of Equipment                          | 6.00           |
| Equipment Maintenance & Troubleshooting     | 6.00           |
| Drawings and Work Orders                    | 4.00           |
| Manipulation of Feeds, Speed, and Pressures | 8.00           |
| Quality Assurance                           | 4.00           |

**Total Hours: 85.00**

##### Lab

| <u>Topics</u>                    | <u>Lab Hrs</u> |
|----------------------------------|----------------|
| Introduction and Safety          | 5.00           |
| CNC Mill                         | 15.00          |
| CNC Lathe                        | 15.00          |
| CNC Press Brake                  | 15.00          |
| CNC Cutting Table                | 15.00          |
| Measuring and Applied Trade Math | 12.00          |

| <u>Topics</u>                           | <u>Lab Hrs</u> |
|-----------------------------------------|----------------|
| Communication Skills                    | 10.00          |
| Tooling I.D. and Selection              | 8.00           |
| Types of Materials                      | 10.00          |
| Types of Equipment                      | 8.00           |
| Equipment Maintenance & Troubleshooting | 10.00          |
| Drawings and Work Orders                | 10.00          |
| Feeds, Speed, and Pressures             | 10.00          |
| Quality Assurance                       | 10.00          |

**Total Hours: 153.00**

### Methods of Instruction

- A. Demonstrations
- B. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- C. Laboratory Experiments
- D. Lecture
- E. Multimedia Presentations

### Methods of Evaluation

- A. Exams/Tests
- B. Quizzes
- C. Homework
- D. Lab Projects

### Examples of Assignments

#### Reading Assignments

1. Read module 10 and be prepared to discuss in class.
2. Read assigned trade journal article and be prepared to discuss in class. Read the module on lathe tooling and be prepared to discuss in class.

#### Writing Assignments

1. Write an order of operations for setup techniques used as it relates to a CNC Mill.
2. Write a two-page essay, explaining how the trade journal article can be implemented in workplace safety and how it relates to the class.

#### Out-of-Class Assignments

1. Research online the proper process for replacing tooling in the CNC Mill using manufactures publications and be prepared to discuss in class.
2. Research OSHA publications for the use and safety of drill presses properly and write a one-page essay.

### Recommended Materials of Instruction

Schmid, S., & Kalpakjian, S. (2014). Manufacturing Engineering and Technology. *Pearson, 7th.*

#### Other Learning Materials

All tools listed in the Advanced Manufacturing Program Guide.

### Minimum Qualifications

Machine Tool Technology  
Manufacturing Technology

**Created/Revised by:** Peacock, Miles

**Date:** 02/25/2019