



## Course Outcome Summary

**Course Information      31420314 Machining: Introduction to Machining**

**Description**      This course will provide instruction that will prepare the student for subsequent Machining Technologies Program courses.

**Career Cluster**      Manufacturing

**Instructional Level**      Technical Diploma Courses

**Total Credits**      1.00

**Total Hours**      36.00

<b>Types of Instruction</b>	<b>Instruction Type</b>	<b>Credits/Hours</b>
	Lecture	1 CR / 18 HR

**Purpose/Goals**      To provide the student with the foundation of skills and knowledge required to be safe and successful in the lab/shop settings of subsequent machining courses.

**Textbooks**      No textbook required.

**Learner Supplies**      Safety glasses with side eye protection that meets Z87 OSHA guidelines. Required.  
 Proper work boots - \$35.00-75.00. Required.  
 Scientific calculator (recommend T1-36x Solar). Required.

## Program Outcomes

### 1. MACH 1. Apply basic safety practices in the machine shop

*Type* TSA    *Status* Active

#### Summative Assessment Strategies

- 1.1. in a performance demonstration in the machine shop or lab
- 1.2. in a written examination

#### Criteria

- 1.1. Demonstrate safety procedures
- 1.2. Operate machine with all required guards in place
- 1.3. Maintain clean and organized work environment
- 1.4. Wear appropriate clothing and Personal Protective Equipment (PPE)
- 1.5. Explain proper lock-out tag-out procedures

### 2. MACH 2. Interpret industrial/engineering drawings

*Type* TSA    *Status* Active

#### Summative Assessment Strategies

- 2.1. in a performance demonstration

#### Criteria

- 2.1. Interpret orthographic projections
- 2.2. Interpret lines, symbols, standards, and notations
- 2.3. Interpret a Bill of Materials
- 2.4. Interpret a title block
- 2.5. Determine location of part features according to established specifications
- 2.6. Calculate tolerances according to established specifications
- 2.7. Develop drawings that follow view projection standards
- 2.8. Interpret Geometric Dimensioning and Tolerancing

### 3. MACH 3. Apply precision measuring methods to part inspection

*Type* TSA    *Status* Active

#### Summative Assessment Strategies

- 3.1. in a performance demonstration

#### Criteria

- 3.1. Select correct measuring tool for job requirements
- 3.2. Demonstrate care of precision measuring equipment according to established procedures
- 3.3. Convert English/metric measurements
- 3.4. Use standard industry measurement terminology

- 3.5. Perform precision measurement according to established procedures
- 3.6. Complete an inspection document to verify print specifications
- 3.7. Use computer aided metrology

#### **4. MACH 4. Perform basic machine tool equipment set-up and operation**

*Type TSA Status Active*

##### **Summative Assessment Strategies**

- 4.1. in a performance demonstration
- 4.2. given an engineering drawing

##### **Criteria**

- 4.1. Select and load tools according to the requirements of the job
- 4.2. Select and set up work-holding devices for specific operations
- 4.3. Verify machine set-up
- 4.4. Verify proper application of speeds and feeds
- 4.5. Operate machine tools according to established procedures
- 4.6. Complete project within specified timeframe
- 4.7. Take action to optimize machine tool operation

#### **Course Competencies**

##### **1. Demonstrate selection and use of personal protective equipment**

*Domain Psychomotor Level Practicing Status WIP*

##### **Assessment Strategies**

- 1.1. Demonstration
- 1.2. Written assignments, quizzes, and tests.

##### **Criteria**

- 1.1. You wear proper clothing and all PPE correctly while in the machine shop 100% of the time.
- 1.2. You correctly identify PPE requirements for various situations with 100% accuracy.
- 1.3. You identify safe and unsafe practices/clothing for a machine shop setting with 100% accuracy.
- 1.4. You complete all related assignments, quizzes and tests with average score of 70% or better.

##### **Learning Objectives**

- 1.a. Describe dress code for and industrial setting.
- 1.b. Identify proper PPE for a given situation/process.
- 1.c. Explain proper use of PPE.
- 1.d. Ascertain PPE requirements from SDS(MSDS) information.

## 2. Demonstrate safe lifting practices

*Domain Psychomotor Level Practicing Status WIP*

### Assessment Strategies

- 2.1. Demonstration
- 2.2. Written assignments, quizzes, and tests.

### Criteria

- 2.1. You demonstrate proper lifting techniques
- 2.2. You employ mechanical lifting devices correctly as needed
- 2.3. You complete related assignments, quizzes and test questions with an average score of 70% or better.

### Learning Objectives

- 2.a. Describe proper lifting techniques.
- 2.b. Recognize situations where mechanical lifting devices are needed.

## 3. Relate proper emergency response actions.

*Domain Cognitive Level Analyzing Status WIP*

### Assessment Strategies

- 3.1. Written assignments, quizzes, and tests.
- 3.2. Drawing/Illustration

### Criteria

- 3.1. You complete all related assignments, quizzes and tests with an average score of 70% or better.
- 3.2. You sketch locations of first aid kits, fire extinguishers, other first aid devices, and emergency exits for various shop/lab areas.

### Learning Objectives

- 3.a. Describe first aid actions for various common work related injuries.
- 3.b. Describe the dangers and precautions associated with blood borne pathogens.
- 3.c. Explain emergency evacuation procedures.
- 3.d. Explain proper use of a fire extinguisher.
- 3.e. Locate first aid information for chemicals.

#### **4. Characterize various metals and their properties as they relate to their uses.**

*Domain Cognitive Level Analyzing Status WIP*

##### **Assessment Strategies**

- 4.1. Written assignments, quizzes, and tests

##### **Criteria**

- 4.1. You complete all related assignments, quizzes, and tests with an average score of 70% or better.

##### **Learning Objectives**

- 4.a. Identify the properties and uses of various types of iron and steel.
- 4.b. Identify the properties and uses of various non-ferrous metals.

#### **5. Relate machining theory principles to machining applications.**

*Domain Cognitive Level Applying Status WIP*

##### **Assessment Strategies**

- 5.1. Written assignments, quizzes, and tests.
- 5.2. Shop projects.

##### **Criteria**

- 5.1. You complete all related assignments, quizzes, and tests with an average score of 70% or better.
- 5.2. You complete all project related procedures/operations with an average score of 75% or better.

##### **Learning Objectives**

- 5.a. Recognize aspects of cutting tool geometry, its purpose, and its function.
- 5.b. Calculate correct speeds and feeds for various types of machining operations.
- 5.c. Compare the use of high-speed steel and carbide cutting tools in machining applications.
- 5.d. Determine cutting fluid recommendations for various machining operations.

## **6. Apply machining reference markings to the workpiece.(Layout)**

*Domain Psychomotor Level Practicing Status WIP*

### **Assessment Strategies**

- 6.1. Written assignments, quizzes, and tests.
- 6.2. Shop projects

### **Criteria**

- 6.1. You complete all related assignments, quizzes, and tests with an average score of 70% or better.
- 6.2. You complete all project related procedures/operations with an average score of 75% or better.

### **Learning Objectives**

- 6.a. Describe the proper preparation procedures for laying out a workpiece.
- 6.b. Determine datum(edges) that reference markings must be associated with.
- 6.c. Determine layout tools needed for the situation.

## **7. Demonstrate proper use of vertical and horizontal cutoff saws.**

*Domain Psychomotor Level Practicing Status WIP*

### **Assessment Strategies**

- 7.1. Shop projects.
- 7.2. Written assignments, quizzes, and tests.

### **Criteria**

- 7.1. You complete all project related procedures/operations with a score of 75% or better.
- 7.2. You complete all related assignments, quizzes, and tests with an average score of 70% or better.

### **Learning Objectives**

- 7.a. Recognize potential safety hazards associated with cutoff saws and operations.
- 7.b. Demonstrate proper use of workholding devices associated with cutoff saws.
- 7.c. Select proper saw band for various sawing situations.
- 7.d. Select proper cutting fluid for various sawing situations.

## **8. Demonstrate various operations commonly performed on drilling machines.**

*Domain Psychomotor Level Practicing Status WIP*

### **Assessment Strategies**

- 8.1. Written assignments, quizzes, and tests.
- 8.2. Shop project.

### **Criteria**

- 8.1. You complete all related assignments, quizzes, and tests with an average score of 70% or better.
- 8.2. You complete all project related procedures/operations with an average score of 75% or better.

### **Learning Objectives**

- 8.a. Recognize potential safety hazards associated with drilling machines and processes.
- 8.b. Use proper tooling for various operations commonly performed on drilling machines.
- 8.c. Use proper cutting fluids for various operations commonly performed on drilling machines.
- 8.d. Demonstrate proper use of workholding devices commonly used on drilling machines.
- 8.e. Demonstrate proper hole location techniques.
- 8.f. Determine proper speeds and feeds for various operations commonly performed on drilling machines.

## **9. Demonstrate proper housekeeping practices.**

*Domain Psychomotor Level Practicing Status WIP*

### **Assessment Strategies**

- 9.1. Written assignments, quizzes, and tests.
- 9.2. Shop practices.

### **Criteria**

- 9.1. You complete all related assignments, quizzes, and tests with an average score of 70% or better.
- 9.2. You complete all related practices on all machines you work with in the shop 100% of the time.
- 9.3. You follow all practices in the shop as a whole 100% of the time.

### **Learning Objectives**

- 9.a. Describe actions that must be taken after completing work at/in any given work station/area.