

# Machining I

## Course Outcome Summary

### Course Information

Total Credits                      3

### Description

Students will learn to conduct job hazard analysis for conventional mills and lathes, develop math skills for machine tool operations, perform preventive maintenance and housekeeping on conventional mills and lathes, select work holding devices for mills, lathes and other machine tools, calculate feeds and speeds, remove material using milling and turning processes, align milling head, use a vertical mill to center drill, drill and ream holes, change tools and tool holders on milling machines, and maintain saws and grinders.

### Prerequisites

OSHA 10 or 30 Safety Course

### Exit Learning Outcomes

#### Program Outcomes

- A. Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines
- B. Manufacture parts from various materials in accordance with specifications from blueprints, electronic drawings and shop sketches
- C. Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking
- D. Apply safety principles in a work environment to minimize hazards and prevent losses to productivity
- E. Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields
- F. Use CAD and CAM programs to design parts and program manufacturing machines

### Competencies

#### 1. Conduct job hazard analysis (JHA) for conventional mills and lathes

##### Properties

Domain: Cognitive    Level: Application

##### Linked Program Outcomes

Apply safety principles in a work environment to minimize hazards and prevent losses to productivity

#### 2. Develop math skills for machine tool operations

##### Properties

Domain: Cognitive    Level: Synthesis

##### Linked Program Outcomes

Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking

Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields

- 3. Convert metric/English measurements**

**Properties**  
Domain: Cognitive Level: Comprehension

**Linked Program Outcomes**  
Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking
- 4. Perform preventive maintenance on manual lathes**

**Properties**  
Domain: Psychomotor

**Linked Program Outcomes**  
Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines  
Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking  
Apply safety principles in a work environment to minimize hazards and prevent losses to productivity
- 5. Select work holding devices**

**Properties**  
Domain: Cognitive Level: Analysis

**Linked Program Outcomes**  
Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines  
Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking  
Apply safety principles in a work environment to minimize hazards and prevent losses to productivity
- 6. Calculate cutting speeds and feeds for an assigned project**

**Properties**  
Domain: Cognitive Level: Application

**Linked Program Outcomes**  
Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking  
Apply safety principles in a work environment to minimize hazards and prevent losses to productivity
- 7. Perform operations using tailstock**

**Properties**  
Domain: Psychomotor

**Linked Program Outcomes**  
Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines  
Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking  
Apply safety principles in a work environment to minimize hazards and prevent losses to productivity
- 8. Set speeds, feeds and depth of cut on milling machines**

**Properties**  
Domain: Psychomotor Level:

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking

Apply safety principles in a work environment to minimize hazards and prevent losses to productivity

**9. Perform O.D. facing and turning operations**

**Properties**

Domain: Psychomotor

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking

Apply safety principles in a work environment to minimize hazards and prevent losses to productivity

Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields

**10. Perform maintenance on vertical/horizontal milling machines**

**Properties**

Domain: Psychomotor

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking

Apply safety principles in a work environment to minimize hazards and prevent losses to productivity

**11. Change tools and holders on milling machines**

**Properties**

Domain: Psychomotor Level:

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking

Apply safety principles in a work environment to minimize hazards and prevent losses to productivity

Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields

**12. Align vertical mill head**

**Properties**

Domain: Psychomotor Level:

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking

Apply safety principles in a work environment to minimize hazards and prevent losses to productivity

Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields

**13. Use a vertical mill to center drill, drill and ream holes**

**Properties**

Domain: Psychomotor Level:

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking

Apply safety principles in a work environment to minimize hazards and prevent losses to productivity

Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields

**14. Remove material using milling and turning processes**

**Properties**

Domain: Psychomotor Level:

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Manufacture parts from various materials in accordance with specifications from blueprints, electronic drawings and shop sketches

**15. Machine parts square on milling machines**

**Properties**

Domain: Psychomotor Level:

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Manufacture parts from various materials in accordance with specifications from blueprints, electronic drawings and shop sketches

Solve quality problems using process planning, technical knowledge, teamwork, mathematics, and critical thinking

**16. Maintain saws**

**Properties**

Domain: Cognitive Level: Application

**Linked Program Outcomes**

Operate machine tool equipment commonly found in industry including manual and computer controlled lathes, milling machines, drill presses and cutting machines

Demonstrate employability skills needed to obtain and retain employment in machine tool and related fields