Machining I
Course Outcome Summary
Updated November 2022

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 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

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