### Machinist I

**Course Description**

**Catalog Year: 2021, Required Hours: 900**

#### Required Core Courses (900 hours required)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
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<tbody>
<tr>
<td>MACH1110</td>
<td>Machining Introduction</td>
<td>60.00</td>
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<tr>
<td>MACH1300</td>
<td>Blueprint Reading</td>
<td>60.00</td>
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<tr>
<td>MACH1400</td>
<td>Lathe Operations</td>
<td>180.00</td>
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<tr>
<td>MATH1250</td>
<td>Machinist Math</td>
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<tr>
<td>MACH1502</td>
<td>Mill Operations I</td>
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<tr>
<td>MACH1340B</td>
<td>Geometric Dimensioning and Tolerancing I (GD&amp;T I)</td>
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- **MACH1110 Machining Introduction**
  - An introductory course to basic procedures and machining operations encountered in the machine shop manufacturing industry. Topics include essential safety practices, MSDS, use of basic measuring tools, and applications of bench grinding and sawing.

- **MACH1300 Blueprint Reading**
  - A course to teach how to read and interpret mechanical blueprints. Topics include the alphabet of lines, interpreting title block data, reading dimensions, tolerances, surface finish, and interpreting multiple-view drawings, with sectional, auxiliary and projected views.

  Competencies:
  - Interpret blueprint title block and revision information
  - Apply skills to visualize a three-dimensional part from a blueprint drawing
  - Calculate dimensions and tolerances from views shown on a blueprint
  - Identify surface finish requirements
  - Determine threading data from blueprint specifications
  - Calculate taper dimensions from blueprint specifications

- **MACH1400 Lathe Operations**
  - Students will learn essential material cutting concepts by setting up and operating a manual lathe. Topics include chuck type work holding devices, cutting tool selection, efficient tool management, speeds and feeds, angles, threads, part production, and inspection.

  Competencies:
  - Demonstrate safe operation of a lathe
  - Demonstrate proper machine maintenance and workstation cleanup
  - Demonstrate proper work holding device selection and setup
  - Demonstrate proper lathe cutting tool selection and setup
  - Demonstrate efficient speeds and feeds for lathe tooling
  - Perform accurate lathe OD machining operations
  - Perform accurate lathe ID machining operations
  - Create and evaluate surface finishes
  - Calculate data for cutting and measuring threads

- **MATH1250 Machinist Math**
  - This course provides a working knowledge of basic technical mathematics to prepare students for Machinist career. Topics include linear measurement, metrics, algebra, geometry and trigonometry fundamentals.

- **MACH1502 Mill Operations I**
  - Students will learn essential material cutting concepts by setting-up and operating milling machines. Topics include principles of clamping and locating work pieces, selection of cutting tools and holders, milling speeds and feeds, application of cutting depth, width, and direction, part production, and inspection.

  Competencies:
  - Demonstrate safe operation of a milling machine
  - Demonstrate proper machine maintenance and workstation cleanup
  - Demonstrate proper work-holding device selection and setup
  - Demonstrate proper efficient speeds and feeds for milling cutters
  - Solve problems using mathematical calculation

- **MACH1340B Geometric Dimensioning and Tolerancing I (GD&T I)**
  - This course teaches students to interpret Geometric Dimensioning and Tolerancing (GD&T) on blueprints used in manufacturing. Topics include symbols, terms, datum, material condition modifiers, and application of tolerance zones.

  Competencies:
  - Apply knowledge of GD&T symbols to solve problems of linear tolerances
  - Apply knowledge of GD&T symbols to solve tolerance problems of feature form, profile, and function
  - Apply knowledge of GD&T symbols to solve problems of location and positional tolerances
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<th>Course Title</th>
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<td>MACH1600</td>
<td>CNC Operations I</td>
<td>150.00</td>
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<tr>
<td>MACH2100</td>
<td>Geometric Dimensioning and Tolerancing II (GD&amp;TII)</td>
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<td>MACH2410</td>
<td>CNC Operations II</td>
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**MACH1600 CNC Operations I**

This course introduces CNC machining. Topics include safety, CNC terminology, preparatory steps to run a CNC program, setup and operation of CNC milling machines, and perform part production and inspection.

Competencies:
- Demonstrate proper workholding for CNC machining
- Demonstrate basic CNC machine setup
- Demonstrate setting program zero for CNC machines
- Perform manual mode operation, edit mode, MDI (manual data input) and program operation mode
- Apply recognition of program codes to CNC machine operation
- Apply knowledge of motion commands of rapid positioning, linear interpolation, and circular interpolation
- Apply proper feeds, speeds, and chip load to quality part production
- Apply CSS (Constant surface speed) and constant RPM (Revolutions Per Minute)
- Perform necessary operations to load a program, set tool offsets, and set cutter or nose radius compensations

**MACH2100 Geometric Dimensioning and Tolerancing II (GD&TII)**

This course teaches students to interpret Geometric Dimensioning and Tolerancing (GD&T) on blueprints used in manufacturing. Topics include symbols, terms, datum, material condition modifiers, and application of tolerance zones.

Competencies:
- Apply GD&T to interpret MMC, LMC, and RFS
- Apply GD&T to determine tolerances of form and location
- Apply GD&T to positional tolerances
- Demonstrate application of datums
- Apply GD&T concepts for tolerancing assemblies

**MACH2410 CNC Operations II**

This course introduces programming and advanced operation of CNC turning machines. Students will create CNC programs manually and use them, verify programs, use canned cycles and roughing cycles, and perform part production and inspection for turning machines. Students will also learn to setup and operate a 5-axis machine to create parts.