

# Machine Tool Technology

## Degree

- Machine Tool Technology - Numerical Control Technology (MTT.CNC.AAS) (<http://catalog.oaklandcc.edu/programs/machine-tool-technology/machine-tool-technology-aas/>)

## Certificate

- Machine Tool Technology - Numerical Control Technology (MTT.CNC.CT) (<http://catalog.oaklandcc.edu/programs/machine-tool-technology/machine-tool-technology-certificate/>)

## Machine Tool Technology Courses

**MTT 1000 Introduction to Computer Numerical Control (CNC)** ..... 4 Credit Hours  
**Equivalent:** MTT 2100 | ATM 1300

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Pre- or Corequisite:** MTT 1150 and TED 1030 (Recommended)

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

The student will gain a basic knowledge of CNC as it relates to the machine tool metal cutting industry. The fundamental CNC concepts of tool and work offsets, machine setup, and basic machine maintenance will be covered through text materials, demonstrations, and hands on activities. Beginning with simple operations, the student will perform layout, filing, cutting, drilling, and tapping objectives. The student will also perform simple operations on the manual lathe, band saw and milling machine. Upon completion of this course, the student will display a working knowledge of CNC programming, including coordinate systems and G & M codes. Safety is greatly emphasized and practiced daily. BILLABLE CONTACT HOURS: 4

**MTT 1050 G&M Code CNC Programming** ..... 4 Credit Hours  
**Equivalent:** MTT 2200 | ATM 2100

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** MTT 1000 or consent of instructor.

**Pre- or Corequisite:** MTT 1150 and TED 1030 (Required)

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course is designed to provide students with extensive training in G and M code manual programming of CNC mills and lathes. Students will create programs for many processes such as drilling, milling, turning, facing, grooving, tapping, threading, and boring. Students will perform all tool and work offsets to create parts. Safety is greatly emphasized and practiced daily. BILLABLE CONTACT HOURS: 4

**MTT 1100 Introduction to Machine Tools** ..... 3 Credit Hours  
**Equivalent:** ATM 1100 | TES 1110

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** APM 8110 or placement into MAT 1100 or higher.

**Pre- or Corequisite:** TED 1030 (Recommended)

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course exposes students to the practical application of machine hand tools through text materials and performance objectives. Beginning with simple operations, the student will perform layout, cutting, drilling, filing, and tapping objectives. The student will also perform simple operations on the lathe, band saw and the milling machine. Blueprint reading exercises will be performed to develop students' spacial aptitude and visual acuity. Safety is greatly emphasized and practiced daily. BILLABLE CONTACT HOURS: 3

**MTT 1150 Metrology** ..... 2 Credit Hours  
**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

This course will introduce the student to the concepts of measurement systems, units, measuring tools, calibration and validation. Students will demonstrate how to properly adjust, hold, utilize, maintain and calibrate many common measuring tools such as rules, calipers, micrometers, gage blocks, angle measurement devices, thread measurement devices, and other instruments. Students will utilize a variety of measurement disciplines and case studies so that the participants will be able to apply the concepts to any measurement disciplines upon completion. Topics are covered in a mixture of training styles including lecture, hands-on exercises, case studies and discussion. BILLABLE CONTACT HOURS: 2

**MTT 1200 Machine Tool Setup & Operation** ..... 3 Credit Hours  
**Equivalent:** ATM 1120 | TES 1120

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** MTT 1000 or consent of instructor.

**Pre- or Corequisite:** MTT 1150 and TED 1030

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course covers the practical application of machine set up and operation through related projects, text materials and performance objectives. Mill tramming and alignment as well as setup of auxiliary devices will include rotary tables, super spacers, vises, angle plates, and boring heads. Lathe setups will include 3-jaw universal chucks, 4-jaw chuck, between centers, and offset tailstock. Students will perform all inspections of projects created. Safety is greatly emphasized and practiced daily. BILLABLE CONTACT HOURS: 4

**MTT 1300 Advanced Machining Processes .....3 Credit Hours**  
**Equivalent:** ATM 1140

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** MTT 1200 or consent of instructor.

**Pre- or Corequisite:** CAD 1050 (Required) MAT 1560 or APM 8210 (Recommended)

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course covers advanced skills in machine tool operation. Both theory and hands-on experiences will reinforce the instruction. Several projects will be produced by the student, each project involving more complex machining operations on the surface grinder, OD grinder, lathe, and vertical mill. Safety and proper work habits are greatly emphasized. BILLABLE CONTACT HOURS: 4

**MTT 1400 Manufacturing Processes .....3 Credit Hours**  
**Equivalent:** MEC 1010

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** MAT 1100 or higher; or consent of instructor.

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course is an introduction to manufacturing processes such as safety, materials, machining, welding, casting, forging, forming, molding, design, inspection, quality, just-in-time manufacturing, lean manufacturing and automation. Projects related to manufacturing processes will be performed. BILLABLE CONTACT HOURS: 4

**MTT 2250 Fundamentals of Computer Aided Manufacturing ..3 Credit Hours**

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** CAD 1501 and MTT 1050 or consent of instructor.

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course is designed to introduce students to Computer Aided Manufacturing (CAM). Students will demonstrate proper workflow through the necessary modules to create tools, holders, workpieces, fixturing and setups for the CAM process. Collision detection, toolpath editing, and suspect geometry editing will also be manipulated. 2D part creation and programming will be explored. Operator safety is greatly emphasized and practiced through safe toolpaths. BILLABLE CONTACT HOURS: 3

**MTT 2300 2D & 3D Computer Aided Machining .4 Credit Hours**  
**Equivalent:** ATM 2300

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** MTT 2250 or consent of instructor.

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course covers the basics of Computer Aided Machining (CAM) as it relates to the machine tool metal cutting industry. The student will develop techniques to prepare design for machining 2D and 3D contour products. The student will use appropriate CAM software to prepare for large and small industries. Safety is greatly emphasized and practiced daily. BILLABLE CONTACT HOURS: 4

**MTT 2400 Jig & Fixture Assemblies .....3 Credit Hours**

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** MTT 2250 or consent of instructor.

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course provides knowledge of jig & fixture assemblies as it relates to the manufacturing industry. The student will develop techniques to design and machine rigid, repeatable, and robust fixturing for holding parts to perform various manufacturing operations. Use of appropriate CNC and manual machining methods will be used to complete projects. Safety is greatly emphasized and practiced daily. BILLABLE CONTACT HOURS: 4

**MTT 2500 Multi-Axis Computer Aided Manufacturing .....3 Credit Hours**

**English/ESL Placement:** Placement into ENG 1060 or higher (or placement into ESL 2510 or higher for students taking the ESL sequence of courses).

**Prerequisite:** MTT 2300 or consent of instructor.

**Note:** Prerequisites for courses in this department are not automatically waived for College Guest students and students with a bachelor's degree or higher from a U.S. institution.

This course is designed to introduce students to Multi-Axis CAM programming for machining centers. Students will be taught when to utilize 3+1, 3+2 and simultaneous 5-axis workflows for cutting complex 3D geometries on machining centers. Collision detection, fixture placement and part optimization will be covered. Operator safety is greatly emphasized and practiced through safe toolpaths. BILLABLE CONTACT HOURS: 3