

MACHINE TECHNOLOGY (MACH)

MACH A100 **3 Units (36 lecture hours; 54 lab hours)**
Introduction to Machine Shop
Grading Mode: Standard Letter
Transfer Credit: CSU.

A basic course in machine shop practices.

MACH A105 **5 Units (54 lecture hours; 108 lab hours)**
Lathe
Advisory: MACH A100, MACH A120 and MACH A121.

Grading Mode: Standard Letter
Transfer Credit: CSU.

A basic course in engine lathe operation to include ID and OD threading, knurling, boring, turning, facing, and cutting tapers. This course also includes exposure to the chucker lathe, tracer lathe, and the turret lathe. Safety and measurement are also emphasized.

MACH A110 **5 Units (54 lecture hours; 90 lab hours)**
Milling Machine
Advisory: MACH A100 and MACH A120.

Grading Mode: Standard Letter
Transfer Credit: CSU.

A basic course in milling machine operations to include both vertical and horizontal milling usage, theory, and usage of tools and accessories. Safety is also emphasized.

MACH A115 **2 Units (18 lecture hours; 54 lab hours)**
Production Machining Techniques
Prerequisite(s): MACH A100 and MACH A105 and MACH A110 or permission of instructor.

Grading Mode: Standard Letter
Transfer Credit: CSU.

This course emphasizes production machining. Set up and running of more than one part on a variety of machines including but not limited to engine lathe, chucker lathe, ID and OD grinder, vertical mill and horizontal mill.

MACH A120 **3 Units (54 lecture hours)**
Measurement and Blueprint Reading
Grading Mode: Standard Letter
Transfer Credit: CSU.

A study of blueprint reading and measuring systems used in manufacturing, including an in-depth study of the basic and advanced measuring tools used by machinists. Common blueprint formats and dimension practices will be explored. Geometric dimensioning and tolerancing will be discussed.

MACH A121 **3 Units (54 lecture hours)**
Computations for Machinists
Grading Mode: Standard Letter
Transfer Credit: CSU.

A course in applied technical computations for students in machine technology and CNC studies. Topics include basic computations, shop formulas and equations, and applied trigonometry as used in the machining industries. This course may be taken two times.

MACH A122 **1.5 Units (18 lecture hours; 27 lab hours)**
Machine Shop Insepection
Advisory: MACH A120.

Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU.

This course provides a basic understanding of the purpose and procedures for verifying the dimensional properties of manufactured parts. Students will train and practice, using appropriate inspection equipment. Graded or Pass/No Pass option.

MACH A125 **3 Units (36 lecture hours; 54 lab hours)**
CNC Machine Operation 1
Advisory: MACH A105 and MACH A110.

Grading Mode: Standard Letter
Transfer Credit: CSU.

A basic course in the operation of computerized numerically controlled lathes and mills, including machine functions, tooling setup, reading machine language, part setup, and machine manipulation. Includes production of parts on both lathes and mills.

MACH A126 **2 Units (18 lecture hours; 54 lab hours)**
CNC Machine Operation 2
Advisory: MACH A125 or instructor approval.

Grading Mode: Standard Letter
Transfer Credit: CSU.

Students will learn advanced features of state-of-the-art CNC lathes and mills, make their own fixtures, write the necessary programs, and produce the parts on CNC machines.

MACH A130 **3 Units (54 lecture hours)**
Introduction to CNC and Manual Programming
Advisory: MACH A105 and MACH A110 or approval of instructor.

Grading Mode: Standard Letter
Transfer Credit: CSU.

A basic course in computerized numerical control of machine tools. Types of control systems, capabilities and the different machine languages are examined. Elementary parts programming in two-axis systems, including all steps necessary to complete a part on both CNC lathes and mills.

MACH A133 3 Units (54 lecture hours; 18 lab hours)
CNC Programming-Mastercam 1
Advisory: CHT A100 or CIS A100 or MACH A130.

Grading Mode: Standard Letter
Transfer Credit: CSU.

Students will receive hands-on training in the use of Mastercam CNC programming software. The basics of two-dimensional part programming, including geometry development, milling, drilling, tapping, pocketing, and more will be explored.

MACH A134 3 Units (54 lecture hours; 18 lab hours)
CNC Programming-Mastercam 2
Prerequisite(s): MACH A133.

Grading Mode: Standard Letter
Transfer Credit: CSU.

Advanced CNC programming using Mastercam to program CNC machines. Instruction emphasizes complex cutter movement and surfacing. This course may be taken two times.

MACH A141 1.5 Units (18 lecture hours; 18 lab hours)
Mastercam Lathe
Prerequisite(s): MACH A133.

Grading Mode: Standard Letter
Transfer Credit: CSU.

A course designed for students who have completed the basic Mastercam class, MACH A133, and wish to have concentrated instruction on CNC lathe programming on lathe only.

MACH A142 2 Units (36 lecture hours; 18 lab hours)
Mastercam Solids
Prerequisite(s): MACH A133.

Grading Mode: Standard Letter
Transfer Credit: CSU.

An intermediate course in CNC programming using the solids feature of Mastercam. This course will introduce students to solid modeling creation using Mastercam. Boolean addition and subtraction, as well as filleting, chamfering, and the machining of solids models.

MACH A146 1.5 Units (18 lecture hours; 27 lab hours)
Machining with MasterCAM
Grading Mode: Standard Letter, Pass/No Pass
Transfer Credit: CSU

An intermediate course in manufacturing with vertical machining centers using MasterCAM to develop programs for the purpose of creating metal parts. Basic 2-D toolpaths as well as advanced 3-D toolpath techniques will be discussed and created. Graded or Pass/No Pass option.

MACH A147 2 Units (18 lecture hours; 54 lab hours)
Introduction to 5 Axis Machining
Advisory: MACH A125, MACH A126, and MACH A130.

Grading Mode: Standard Letter
Transfer Credit: CSU.

Students will learn basic features of state-of-the-art CNC 5 axis mills. Write necessary manual programs, and produce the parts on The CNC 5 axis machine, with the aid of 5 axis CNC simulation software.

MACH A148 5 Units (54 lecture hours; 108 lab hours)
Advanced Multi Axis Programming & Machining
Advisory: MACH A125, MACH A126, and MACH A130.

Grading Mode: Standard Letter
Transfer Credit: CSU.

In this course, students will learn how to program complex parts, create advanced setups and run the parts on 5-axis CNC Mills. AutoDesk Fusion 360 will be explored to create the G-code needed to run the parts on the machines.

MACH A152 3 Units (36 lecture hours; 54 lab hours)
Introduction to SolidWorks
Grading Mode: Standard Letter
Transfer Credit: CSU

The fundamentals of computer-aided design and drafting using SolidWorks software. Application of SolidWorks in creating manufacturing models will be covered.

MACH A158 0.5 Units (9 lecture hours; 18 lab hours)
Additive Manufacturing/3D Printing
Grading Mode: Standard Letter
Transfer Credit: CSU.

Additive Manufacturing deals with aspects of additive, subtractive, and joining processes to form three-dimensional parts with applications ranging from prototyping to production. Additive manufacturing processes directly from computer-aided-design (CAD) models. In this course, students will learn about a variety of AM and other manufacturing technologies, their advantages and disadvantages for producing both prototypes and functional production quality parts.

MACH A175 3 Units (54 lecture hours)
Dimensioning and Tolerancing
Advisory: MACH A120.

Grading Mode: Standard Letter
Transfer Credit: CSU.

A course in reading and using Reference (SME Y-14.5-1994) standards for geometric dimensioning and tolerancing.

MACH A190 **2 Units (36 lecture hours)****Elementary Metallurgy****Grading Mode:** Standard Letter**Transfer Credit:** CSU.

An elementary course describing the relationship between microstructure, composition, heat, and mechanical treatment and physical properties of metal and alloys; their relationship to design and machining.

MACH A195 **3 Units (54 lecture hours)****Manufacturing Processes****Grading Mode:** Standard Letter**Transfer Credit:** CSU.

A study of engineering materials and manufacturing processes from the viewpoint of the machinist, draftsman, and designer. Course discusses the problems of material selection coupled with economical manufacturing methods.

MACH A199 **1-4 Units (9-72 lecture hours; 0-54 lab hours)****Current Topics in Machine Technology****Grading Mode:** Standard Letter, Pass/No Pass**Transfer Credit:** CSU.

Current issues in the field of Manufacturing Technology, rotating through a variety of topics, such as inspection, quality control, lean manufacturing, rapid prototype, materials, and other topics related to manufacturing. Graded or Pass/No Pass option.

MACH A200 **2.5 Units (36 lecture hours; 36 lab hours)****Tooling****Advisory:** MACH A100, MACH A105, MACH A110, and MACH A120.**Grading Mode:** Standard Letter**Transfer Credit:** CSU.

A basic course in the making of jigs, fixtures, and molds.