

Machine Technology (MACH)

The program prepares students for employment as a machinist apprentice, machinist, maintenance machinist, and CNC operator and/or programmer.

Degree Major/Certificate Requirements:

| Dept/No. | Title | Units |
|------------------------------|--|-----------|
| FIRST SEMESTER | | |
| MACH 205 | Geometric Dimensioning and Tolerancing | 3 |
| MACH 210 | Machine Technology I | 5 |
| MATH 220A*+ | Technical Math with Algebra-Part 1 (Lab) | .5 |
| MATH 220B*+ | Technical Math with Algebra-Part 2 (Lab) | .5 |
| MATH 220C*+ | Technical Math with Algebra-Part 3 (Lab) | .5 |
| MATH 220D*+ | Technical Math with Algebra-Part 4 (Lab) | .5 |
| SECOND SEMESTER | | |
| MACH 20 | CAD Solid Modeling with SolidWorks | 4 |
| MACH 220 | Machine Technology II | 5 |
| MATH 220E*+ | Technical Math with Geometry-Part 1 (Lab) | .5 |
| MATH 220F*+ | Technical Math with Geometry-Part 2 (Lab) | .5 |
| THIRD SEMESTER | | |
| MACH 30+ | Introduction to CNC Programming and CAD/CAM Technology | 4 |
| MACH 230 | Machine Technology III | 5 |
| FOURTH SEMESTER | | |
| MACH 31+ | Advanced CNC and CAD/CAM Programming | 4 |
| MATH 220G*+ | Technical Math with Trigonometry (Lab) | 1 |
| WELD 205 | Introduction to Welding | <u>3</u> |
| Total Required Units: | | 37 |

*A more advanced Mathematics course may be substituted.
+Course may be applied to Associated Degree General Education requirement.

For Associate Degree General Education requirements, refer to page 112.

MACH 20

CAD Solid Modeling with SolidWorks

4 units, 3 hours lecture, 3 hours laboratory (GR or P/NP)

Acceptable for credit: CSU

Fundamentals of computer-aided design (CAD) using SolidWorks software: Application of SolidWorks in creating manufacturing models including solid-part models, assembly models, and engineering drawings. 0956.30

AA/AS area 4c

MACH 30

Introduction to CNC Programming and CAD/CAM Technology

4 units, 3 hours lecture, 3 hours laboratory (GR)

Prerequisite: Mach 210

Acceptable for credit: CSU

Introduction to programming of Computer Numerical Control (CNC) machines using standard programming methods and CAD/CAM software: Emphasis on safety procedures, tool and part setups, and machine and controller operation. 0956.30

AA/AS area 4c

MACH 31

Advanced CNC and CAD/CAM Programming

4 units, 3 hours lecture, 3 hours laboratory (GR)

Prerequisite: Mach 30

Acceptable for credit: CSU

Advanced CNC programming: Emphasis on standard programming language, conversational programming, and CAD/CAM programming using Mastercam; programming covers mill and lathe operations. 0956.30

AA/AS area 4c

MACH 48GA-MZ

Selected Topics in Machine Technology

.5-9 units, 0-9 hours lecture, 0-27 hours laboratory (GR)

Acceptable for credit: CSU

See section on Selected Topics. 0956.30

Machine Technology

MACH 75

Geometric Dimensioning and Tolerancing

2 units, 2 hours lecture (GR)

Recommended preparation: Mach 210

Acceptable for credit: CSU

Interpretation of specifications and inspection standards related to ANSI/ASME Y 14.5M Geometric Dimensioning and Tolerancing (GD&T) standards: Demonstration and explanation of the standards in designing, machining, and inspection operations through defining the rules, symbols, and relationships covered by Geometric Dimensioning and Tolerancing. 0956.30

MACH 200

Special Projects Laboratory

1-4 units, 3-12 hours laboratory (GR)

Course study under this section may be repeated three times.

Open laboratory for working on selected projects: Provides the opportunity for development of individual interests. 0956.30

MACH 201

Machine Technology for Other Majors

2 units, 1 hour lecture, 3 hours laboratory (GR)

Introduction to machine technology: Processes of manufacturing as applied to machining. 0956.30

MACH 205

Engineering Drawings for Machinists, Welders, and Industrial Maintenance Technicians

3 units, 3 hours lecture (GR or P/NP)

Interpretation of engineering drawings and specification for machinists, welders, and industrial maintenance technicians: Explanation of the rules, symbols, and relationships covered in blueprints, assembly drawings and weldments. Emphasis on ANSI/ASME Y 14.5 Geometric Dimensioning and Tolerancing (GD&T) Standards and use of Coordinate Measuring Machine (CMM) for inspection of GDT specifications. 0956.30

MACH 206

2 units, 1 hour lecture, 3 hours laboratory (GR or P/NP)

Introduction to theory and operation of hydraulic systems: Hydraulic principles, components, symbols, and applications from systems development and troubleshooting perspectives. Emphasis on hydraulic components and their operation in hydraulic circuits. Maintenance and troubleshooting procedures for systems, system components and manufacturing assemblies. 0956.30

MACH 210

Machine Technology I

5 units, 3 hours lecture, 6 hours laboratory (GR or P/NP)

Introduction to the operation and theory of machine tools focusing on shop safety: Blueprint reading and engineering drawings, precision measurement, layout, tool grinding, speed and feed calculations, drill-press operation, lathe operation (turning and threading), and mill setup and operation. 0956.30

MACH 220

Machine Technology II

5 units, 3 hours lecture, 6 hours laboratory (GR or P/NP)

Recommended preparation: Mach 210

Continuation of MACH 210: Internal lathe operations; vertical and horizontal mill setup, operation, and use of milling accessories; carbide tooling selection and geometries; surface grinding; introduction to Geometric Dimensioning and Tolerancing and properties of materials associated with machinability, heat treating, and hardness testing. 0956.30

MACH 230

Machine Technology III

5 units, 3 hours lecture, 6 hours laboratory (GR or P/NP)

Prerequisite: Mach 75 and 220

Continuation of MACH 220: Advanced topics such as machine tool maintenance, tool and cutter grinding, gear cutting and theory, and shop trigonometry; projects based on multiple machining operations and multiple-part assemblies; more in-depth coverage of properties of materials and Geometric Dimensioning and Tolerancing, including the development of inspection gages. 0956.30

MACH 248GA-MZ

Selected Topics in Machine Technology

.5-9 units, 0-9 hours lecture, 0-27 hours laboratory (GR)

See section on Selected Topics. 0956.30

MACH 501

0 unit, 105 hours laboratory (Non credit)

Supervised tutoring of the learning outcomes of courses offered by the Machine Technology Department. 0956.30

COPED 466L

Occupational Work Experience in Machine Technology

1-4 units, hours to be arranged (GR) 0956.30