

# MANUFACTURING TECHNOLOGY (MFG)

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## **MFG 110 Introduction to CAD**

**4 Units** (Degree Applicable, CSU)

Lecture: 54 Lab: 54

Advisory: Eligibility for MATH 51

Basic Computer Aided Design (CAD) and computer applications (AutoCAD and SolidWorks) in engineering and related fields, including basic word processing, spreadsheet, CAD, and presentation applications. Production card and digital calipers required.

## **MFG 120 CAD for Manufacturing**

**4 Units** (Degree Applicable, CSU)

Lecture: 54 Lab: 54

Prerequisite: MFG 110 or CSWA Certification

Formerly EDT 18

Intermediate CAD (Computer Aided Design) for engineering related industries, 2D and 3D environments, 3D parametric solid modeling. Construct assemblies & subassemblies; use and editing of mates. Certified SolidWorks Associate (CSWA) exit exam. Production card and digital calipers required.

## **MFG 130 Manufacturing Processes and Materials**

**3 Units** (Degree Applicable, CSU)

Lecture: 36 Lab: 54

Common manufacturing processes used to cut, bend, form, mold and cast common metal and plastic alloys. Investigates material properties, structural concepts and joining methods. Includes survey of advanced manufacturing technologies.

## **MFG 140 Print Reading and Shop Practice**

**3 Units** (Degree Applicable)

(May be taken for option of letter grade or Pass/No Pass)

Lecture: 36 Lab: 54

Print reading, layout, tools, and methods used in fabrication and manufacturing industries. Print reading fundamentals and mastery of tool and process selection, safety; proficiency in basic machine operation skills.

## **MFG 150 Manual Machining I**

**3 Units** (Degree Applicable, CSU)

Lecture: 36 Lab: 54

Conventional mill and lathe safety and machining practices, tool nomenclature, lathe and mill operation, application and tooling. Application to Computer Numerical Control (CNC) machines. Production cards and calipers required.

## **MFG 155 Manual Machining II**

**2 Units** (Degree Applicable, CSU)

Lecture: 18 Lab: 54

Prerequisite: MFG 150

Intermediate application of conventional mill and lathe safety and machining practices, tool nomenclature, lathe and mill operation, application and tooling. Production cards; safety glasses, hearing protection, and calipers required.

## **MFG 160 Introduction to Mechanical Principles**

**3 Units** (Degree Applicable)

Lecture: 36 Lab: 54

Prerequisite: EDT 16 or MFG 110

Use of mechanical demonstration kits, computer aided design (CAD) and other media to survey mechanical devices, concepts, and principles common to manufactured products and manufacturing processes. Analysis, discussion, and problem solving related to mechanical design scenarios and supported by CAD. Emphasis on mechanical literacy. Production cards and calipers required. Field trips may be required.

## **MFG 180 Introduction to MasterCAM**

**3 Units** (Degree Applicable, CSU)

Lecture: 36 Lab: 54

Advisory: MFG 155

Use MasterCAM X software to create wire-frame part geometry, add tool paths, and create computer numerical control (CNC) code for CNC mills and CNC lathes. Overview of tooling and tooling nomenclature.

## **MFG 210 Advanced CAD**

**3 Units** (Degree Applicable, CSU)

Lecture: 36 Lab: 71

Prerequisite: MFG 120 or CSWA Certification

Formerly EDT 24

Advanced engineering Computer Aided Design (CAD) for developing detailed working drawings in 3D environments, incorporating 3D parametric solid modeling, bill of materials, and surface development. Production card required. Field trip required.

## **MFG 220 Computer Aided Manufacturing II**

**3 Units** (Degree Applicable, CSU)

Lecture: 36 Lab: 71

Prerequisite: MFG 120 and MFG 180

Formerly MFG 38B

Advanced use of industry standard computer aided manufacturing (CAM) software (MasterCam) to generate tool paths and create computer numerical control (CNC) code for operation of CNC mills and CNC lathes. Production cards and calipers required.

## **MFG 250 Introduction to CNC Programming**

**3 Units** (Degree Applicable)

Lecture: 18 Lab: 108

Prerequisite: MFG 150

Theory and practice of manually developing Computer Numerical Control (CNC) programs. Writing and editing program code for CNC mills and lathes. Methods of transmitting data to CNC machines and operation of CNC mills and lathes.

## **MFG 260 CNC Operation**

**3 Units** (Degree Applicable)

Lecture: 18 Lab: 108

Advisory: MFG 250

Operation of computer numerical control (CNC) machines and their applications in manufacturing. Students will learn to analyze and interpret industry prints to determine datums, orient work to the machines, set up, and apply work holding solutions and basic tooling and machining strategies common in the industry. Students will be involved in producing and machining industry representative parts.