

METAL FABRICATION (MTFAB)

MTFAB 50 4 units

Introduction to Metalworking

54 hours lecture, 72 hours laboratory

Grading: letter grade or pass/no pass.

Formerly SHMET 50. This course is designed to provide students with a basic introduction to sheet metal fabrication, layout and career opportunities related to the industry and "green technologies." Students will learn to identify and safely operate hand tools and power machinery used in sheet metal fabrication. They will be instructed in the characteristics and properties of different sheet metal materials. The course will introduce students to measurement, shop math and sheet metal layout. Students will be assigned and evaluated on lab projects which will involve sheet metal layout, forming and fabrication and include the use of mechanical seams, welding and soldering techniques. Students will be required to attend 5 hours in the CTE Success Center for specially designed activities and assignments that relate to this course's content.

Transferable to CSU Only

MTFAB 90 3 units

Computer Integrated Manufacturing

36 hours lecture, 72 hours laboratory

Recommended Preparation: MATH 815 or ELECT 202 and ENGL 801A or equivalent.

Grading: letter grade or pass/no pass.

This course covers the integration of engineering technology principles and automation in manufacturing environments. Students will create three-dimensional designs with modeling software and produce actual components of their designs on Computer Numerically Controlled (CNC) machine tools. Additional topics covered include machine tool operations, simulations, Rapid Prototyping (RP), robotics, and manufacturing systems.

Transferable to CSU Only

MTFAB 202 4 units

Advanced Metal Layout/Fabrication

54 hours lecture, 72 hours laboratory

Corequisite: MTFAB 50.

Grading: letter grade or pass/no pass.

Formerly SHMET 220B and MTFAB 220B. This course is designed for people working in or wishing to enter the Sheet Metal trade in the fields of air conditioning, industrial sheet metal or architectural sheet metal. This course will provide comprehensive instruction in advanced sheet metal layout, including parallel lines, radial lines and triangulation. Students will be introduced to the safe set up and operation of sheet metal fabrication power equipment with emphasis on training equal to industry standards. The course will also introduce the student to "green technologies" as they relate to energy efficiency and Solar Energy Systems found in the Sheet Metal industry. Students will be required to attend 5 hours in a designated Success Center for specially designed activities and assignments that relate to this course's content.

MTFAB 204 4 units

Power Metalworking Machine Operations

54 hours lecture, 72 hours laboratory

Recommended Preparation: MTFAB 50.

Grading: letter grade or pass/no pass.

Formerly SHMET 220C and MTFAB 220C. This course is designed for people working in or wishing to enter the metalworking trades in the fields of construction and manufacturing. This is a comprehensive course in powered sheet metal fabrication equipment. The course will cover the safe set up and operation of press brakes, ironworkers, turret punch, rotary machines, welders, shears, rollformers, tube benders, and notchers. Individualized hands-on experience in tool setup and job shop performance equal to industry standards will be provided. Students will also be introduced to the materials and fabrication techniques necessary to build a solar air heater.

MTFAB 206 4 units

CNC Metal Fabrication Systems

54 hours lecture, 72 hours laboratory

Recommended Preparation: MTFAB 50.

Grading: letter grade or pass/no pass.

Formerly SHMET 220D and MTFAB 220D. This course is designed for people working in or wishing to enter the metalworking trades in the fields of construction and manufacturing. This is a comprehensive course on CNC metal fabrication software as it relates to press brake, plasma cutter, router and tube bender. The course will cover the use of software to design metal components as they relate to the construction and manufacturing fields, with additional emphasis placed on the design of metal products used in the emerging "green energy" fields.

MTFAB 220A 4 units

Basic Metal Layout and Fabrication

54 hours lecture, 72 hours laboratory

Grading: letter grade or pass/no pass.

Formerly SHMET 220A. This course is designed to provide students with a basic introduction to sheet metal fabrication, layout and career opportunities related to the industry and "green technologies." Students will learn to identify and safely operate hand tools and power machinery used in sheet metal fabrication. They will be instructed in the characteristics and properties of different sheet metal materials. The course will introduce students to measurement, shop math and sheet metal layout. Students will be assigned and evaluated on lab projects which will involve sheet metal layout, forming and fabrication and include the use of mechanical seams, welding and soldering techniques. Students will be required to attend 5 hours in a designated Success Center for specially designed activities and assignments that relate to this course's content.

MTFAB 221 2 units

Construction Blueprint Reading

36 hours lecture

Recommended Preparation: MTFAB 220A or MTFAB 50.

Grading: letter grade or pass/no pass.

This course covers the principles of interpreting building blueprints and specifications required by the tradesman in the construction trades. The student will learn to use building plans and specifications to layout and order components used in mechanical systems. The course will also cover the interpretation of schematic drawings of "Green Technologies" as they relate to the construction trades in regards to solar energy systems and architectural roofing systems.

MTFAB 223 2 units**Sheet Metal Duct Systems and Fabrication****36 hours lecture**

Recommended Preparation: MTFAB 220A or MTFAB 50.

Grading: letter grade or pass/no pass.

This course is designed to introduce the student to techniques used to install sheet metal duct systems. Various types of duct systems and their components will be discussed with added emphasis on energy efficiency and sustainability.

MTFAB 260 3 units**Blueprint Reading for Metal Fabrication****54 hours lecture**

Grading: letter grade.

Examines blueprint interpretation practices commonly used by metal fabrication industries. Exposure to common drawing types, symbols, views, lines, dimensions, and tolerances. Emphasis placed on the analysis of welding symbols as approved by the American Welding Society (AWS) and International Organization of Standardization (ISO).

MTFAB 270 2.5 units**Metallurgy****45 hours lecture, 9 hours laboratory**

Grading: letter grade.

Introduces basic metallurgy as applied to metal fabrication and welding. Common heat treatment procedures, welding enhancement procedures, and thermal control of stress and strain in relation to ferrous and non-ferrous metals are emphasized. Proper determination of chemical contents of common steels, cast irons, stainless steels, and aluminum alloys are demonstrated.

MTFAB 280 2.5 units**Introduction to Robotic Welding****36 hours lecture, 27 hours laboratory**

Recommended Preparation: MTFAB 50 or WELD 50.

Grading: letter grade.

The first of a two-part series introducing fundamental theory and hands-on application of robotic welding automation. Emphasizes safety awareness, programming techniques, and basic gas metal arc welding applications using six-axis robotic welding systems.

MTFAB 281 2.5 units**Advanced Robotic Welding****36 hours lecture, 27 hours laboratory**

Prerequisite: MTFAB 280.

Grading: letter grade.

The second of a series of two, introducing advanced level theory and hands-on application of robotic welding automation. Emphasizes safety awareness, programming techniques, and intermediate and advanced gas metal arc welding applications using six-axis robotic welding systems.

MTFAB 420 2 units**Metal Fabrication and Layout****108 hours laboratory**

Recommended Preparation: MTFAB 220A or MTFAB 50.

Grading: letter grade or pass/no pass.

Formerly SHMET 420. This course will address the techniques used in basic metal layout and fabrication. The course will also reinforce safe and correct setup and use of metal fabrication machinery and hand tools. This class is an open entry/exit program, and requires the completion of 108 lab hours.

MTFAB 421 1 units**Metal Fabrication and Layout****54 hours laboratory**

Corequisite: MTFAB 50, 202, 204, 206 or 650.

Grading: pass/no pass.

This course will address the techniques used in basic metal layout and fabrication. The course will also reinforce safe and correct setup and use of metal fabrication machinery and hand tools.

MTFAB 423 3 units**Metal Fabrication and Layout****162 hours laboratory**

Recommended Preparation: MTFAB 220A or MTFAB 50.

Grading: pass/no pass.

This course will address the techniques used in basic metal layout and fabrication. The course will also reinforce safe and correct setup and use of metal fabrication machinery and hand tools.

MTFAB 601 0 units**Exploring Metal Fabrication****4 hours lecture, 13 hours laboratory**

Grading: non graded.

This course is an introduction to metal fabrication. This course will allow the student to explore the basic safety requirements and metal fabrication processes found in the advance manufacturing and welding industries.

MTFAB 621 0 units**Metal Fabrication and Layout****54 hours laboratory**

Corequisite: MTFAB 50, 202, 204, 206 or 650.

Grading: non graded.

This course will address the techniques used in basic metal layout and fabrication. The course will also reinforce safe and correct setup and use of metal fabrication machinery and hand tools.

MTFAB 650 0 units**Introduction to Metalworking****54 hours lecture, 72 hours laboratory**

Grading: non graded.

This course is designed to provide students with a basic introduction to metal fabrication, layout and career opportunities related to the industry. Students will learn to identify and safely operate hand tools and power machinery used in metal fabrication. They will be instructed in the characteristics and properties of different materials. The course will introduce students to measurement, shop math and metal layout. Students will be assigned and evaluated on lab projects which will involve metal layout, forming and fabrication and include the use of mechanical seams, welding and soldering techniques. Students will be required to attend 4 hours in a designated Success Center for specially designed activities and assignments that relate to this course's content.