

Metal Fabrication

Technical Diploma

The Metal Fabrication program will help students develop fabrication skills used in today's manufacturing industries. Students will learn shielded metal arc welding, gas metal arc welding, gas tungsten arc welding, and oxy-fuel cutting methods. Students will also develop blueprint reading skills, design and layout, metal forming and assembly, as well as inspection and quality control. They will gain hands-on experience with automated cutting processes and first-hand exposure assembling metal projects.

Program Outline

TERM 1		
Course #	Course Title	Credits
1044210300	Print Reading Students will develop print interpretation skills needed in metal fabrication. Learners study orthographic projection, dimensioning, and bill of materials. Learners apply concepts in hands-on activities, practicing basic layout skills and safe operation of saws, shears and drills. Corequisites: 3180410100 Math Skills, 3180410200 Geometry Skills.	3.00
1044215700	Thermal Cutting Develops skill in thermal cutting and gouging processes. Learners practice manual and machine oxy-fuel cutting, plasma cutting and gouging and air carbon arc gouging. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	2.00
1044215800	Shielded Metal Arc Welding on Carbon Steel Develop skills in shielded metal arc welding. Learners use 6010 and 7018 "stick" electrodes to complete fillet and groove welds in all positions. Weld quality is assessed per AWS D1.1 Structural Steel Code. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	2.00
1044215900	Gas Metal Arc Welding on Carbon Steel Develop skills in gas metal arc welding. Learners use the "mig" process in all positions on carbon steel. Required welds include fillet and groove welds with short circuit, spray and pulsed spray transfer. Weld quality is assessed per AWS D1.1 Structural Steel Code. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	3.00
1044216300	Weld Inspection and Testing Emphasizes measurement of weld defects and assessment of weld quality conformance to common welding codes. Learners conduct etch tests, bend tests and break tests on welds. The process of procedure and welder qualification is explored through group activities.	1.00
1044217200	Safety in Manufacturing Prepares learners for safe operation of work site equipment. Procedures regarding welding machines, band saws, shears, drill presses, punches, grinders, oxy fuel equipment and an array of hand tools are practiced. Crane and forklift operation are introduced. Corequisite: 3144215600 Welding Metallurgy.	1.00
3144210100	Weld Symbols Students will develop print interpretation skills needed in metal fabrication. Learners study prints containing section views, detail views, and weld symbols. Learners apply concepts in hands-on activities, print interpretation skills, calculating dimensions, identifying and interpreting weld symbols.	1.00

Course #	Course Title	Credits
3180410100	Math Skills Develops skills in using mathematics principles, essential to the technical service and production workplace, through applied learning contexts. Content includes whole numbers, fractions, percent, graphs, and fundamentals of algebra. Corequisite: 1044210300 Print Reading.	1.00
3180410200	Geometry Skills Develops skills in using mathematics principles, essential to the technical service and production workplace, through applied learning contexts. Content includes geometry and trigonometry, and tools and techniques for precision measurement. Corequisite: 1044210300 Print Reading.	1.00
TERM 2		
Course #	Course Title	Credits
1045714800	Metal Cutting Students will develop knowledge of metal cutting saws, shears, plasma, and water jet cutting systems and forming processes. Safety and maintenance is emphasized as students practice cutting techniques on projects. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	2.00
1045715000	Metal Forming Students will develop the concepts of design and building of simple to intermediate jigs and assembly fixtures. Students will use various software applications and metal fabrication equipment to build jig and fixtures for projects used in the class. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	2.00
1045716000	Design and Layout This course provides the opportunity for the learner to develop the knowledge, skills, process, and understanding of basic line and angle construction along with flat pattern development for radial line, parallel line, and triangulation. Students will also be able to design a project and use basic layout procedures. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	1.00
1045717000	Intro to Assembly This course provides the opportunity for the learner to develop advanced blueprint reading skills to read and interpret moderate to advanced blueprints and shop drawings most frequently encountered in industry. Includes multi-view prints, arrangement of views, dimensions and notes, sections, shop sketching, welding symbols, and various welding prints used in the fabrication industry. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	2.00
1045718000	Advanced Assembly Students will translate the competencies established in Design and Layout to the use of forming equipment. Students will create assemblies from industrial drawings conforming to industry standards. Emphasis will be placed on safe operation procedures, the selection of tooling, and calculations required to accurately complete an assembly. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	3.00
1045719000	Fabrication Inspection Students will build upon the competencies established in the Intro to Assembly course. Students will create advanced assemblies from industrial drawings conforming to industry standards. Emphasis will expand upon operational safety, tooling types and selection, multiple types and combinations of bending, as well as assembly techniques. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	2.00
1045719200	Fabrication Students will incorporate measurement of weld defects and assessment of fabrication quality conformance to common welding and assembly codes. Learners conduct etch tests, bend tests and break tests on welds. The process of procedure, welder qualification, and quality control in the fabrication industry is examined. Prerequisite: 1044217200 Safety in Manufacturing (C or better).	3.00

Total Credits: 30.00

Talk with a Success Coach about the program outline. Together, you will determine if credits you've already earned satisfy any requirements, discuss possible alternative courses, and choose the best classes if you're thinking of transferring.

At A Glance

How You'll Learn

2024 Start Dates

January 8	June 3
February 5	July 1
March 4	August 26
May 6	October 21

[VIEW FULL ACADEMIC CALENDAR](#)

What is Competency-Based Education?

Competency-Based Education (CBE) is learning at your own pace by mastering competencies through demonstration. Once all competencies for a program have been assessed and mastered, students will earn a certificate, diploma, or degree.

[LEARN MORE ABOUT CBE](#)

Program Tuition*

\$7,880

Books & Supplies*

\$387

*Total cost for degree completion is estimated by current course requirements, books, and supplies. Tuition and fees are set by the Wisconsin Technical College System and subject to change.

Financial Aid Eligible

► [Potential Indirect Costs](#)

Student Equipment

Students are required to purchase welding kits through the college bookstore or obtain the minimum tools and equipment listed to be able to successfully complete coursework and performance assessments in the welding lab.

- Safety glasses
 - Welders gloves MIG and TIG
 - Chipping hammer
 - Welding beanie
 - 8-way welder pliers
 - Soapstone holder
 - Triple flint spark lighter
 - Tape measure
 - Weld fillet gauge
 - Mag tool
 - Material handling gloves
 - Backhand pad
 - Tool bag
 - Welder pencils
 - Auto darkening helmet
 - Lens cover
 - Welding jacket
-

What You'll Learn

- Learn the basics of cutting, forming and joining common manufacturing materials.
 - Use a variety of manual and programmable equipment, techniques and processes.
 - Develop your technical knowledge of blueprint reading, layout metal fabrication, welding and inspection.
 - Get hands-on training to learn fundamental concepts of safety, measurement, layout, forming, joining, assembly, finishing and production.
 - Perform industry standard welding processes.
 - Produce fabricated assemblies and detailed drawings that conform to industry quality-control methods and standards.
-

Your Potential Careers

- Steel Fabricator
- Welder
- Structural Steel Fitter
- Metal Layout/Designer
- Robotic Welding Operator
- Automated Equipment Operator

Median Annual Salary

\$41,050	\$46,258	\$43,566
Local	State	National

EMSI 2022.1

Get Started

Your application can be submitted online, it takes just a few minutes to complete.

[APPLY NOW](#)