



METAL FABRICATION

Technical Diploma Program Code: 31-457-2 Total Credits: 29

Mid-State's Metal Fabrication program prepares graduates for jobs as fabricators, fitters, mill beam fitters, welder-fabricators, structural-steel fabricators, weld technicians, and structural steel fitters. Students will work with a variety of metals and learn to produce and assemble structural metal products for machinery, ovens, tanks, pipes, stacks, and parts for buildings. They will learn the physical properties of metals and how to read job orders and blueprints. This program prepares students with an understanding of basic design, types of materials and their uses, weld types, and material fitting. Students train on equipment found in local industry and learn to operate press brakes, industrial hydraulic shears, ironworkers, CNC plasma cutting tables, robotic welders, plate rollers, grinders, welders, and various other metal cutting and fitting equipment.

Estimated tuition and fees: mstc.edu/programcosts

ACADEMIC ADVISOR

To schedule an appointment with an academic advisor, call 715.422.5300. Academic advisors will travel to other campuses as necessary to accommodate student needs. For more information about advising, visit mstc.edu/advising.

NEW STUDENT CHECKLIST

Complete the following steps to prepare for your New Student Advising appointment with your academic advisor:

- ☐ Submit a Mid-State application at mstc.edu/apply.
- ☐ Send official transcripts to:
Mid-State Technical College
Student Services
1001 Centerpoint Drive
Stevens Point, WI 54481
- ☐ Complete the Free Application for Federal Student Aid (FAFSA) at fafsa.gov. Mid-State's Financial Aid team is available to assist with your FAFSA application and to answer your financial aid questions. Contact Financial Aid or schedule an appointment at mstc.edu/financial-aid.
- ☐ Set up student MyCampus account at mstc.edu/mycampus-assistance.
- ☐ Schedule a New Student Advising appointment at mstc.edu/advising.



mstc.edu • 888.575.6782 • TTY: 711



ADAMS CAMPUS
401 North Main
Adams, WI 53910

MARSHFIELD CAMPUS
2600 West 5th Street
Marshfield, WI 54449

**STEVENS POINT
DOWNTOWN CAMPUS**
1001 Centerpoint Drive
Stevens Point, WI 54481

WISCONSIN RAPIDS CAMPUS
500 32nd Street North
Wisconsin Rapids, WI 54494

CAREER PATHWAY • BEGIN AT ANY POINT



CREDIT FOR PRIOR LEARNING AND EXPERIENCE

CREDIT FOR PRIOR LEARNING AND EXPERIENCE

- Certifications and Licenses
- High School Credit
- Military Experience
- National/Standardized Exams
- Transfer Credit
- Work and Life Experience

Learn about Credit for Prior Learning at mstc.edu/cpl.

TECHNICAL DIPLOMA

METAL FABRICATION

Technical Diploma • 29 Credits

Start Your Career

- Fabricator
- Metalworker
- Fitter
- Apprenticeship

BACHELOR'S DEGREE

BACHELOR'S DEGREE OPTIONS

For those interested in continuing their education, Mid-State offers transfer agreements with various four-year colleges and universities. For more information and additional opportunities, visit mstc.edu/transfer.

OTHER OPTIONS

RELATED PROGRAMS

- Advanced Manufacturing Technology
- Industrial Mechanical Technician
- Manufacturing Operations Management
- Precision Machining Technician
- Stainless Steel Welding
- Welding

APPRENTICESHIP OPPORTUNITIES

- Ironworker Apprenticeship

OUTCOMES

Employers will expect you, as a Metal Fabrication graduate, to be able to:

- Demonstrate industry recognized safety practices.
- Form materials to detailed drawings.
- Cut materials to detailed drawings.
- Join materials to detailed drawings.
- Layout components/assemblies.
- Inspect product.

PROTECTIVE CLOTHING

Students are required to provide their own protective clothing and equipment. Details of the requirements and where they may be purchased are provided by the program instructor at the beginning of each semester.

STUDENT HANDBOOK

Visit mstc.edu/studenthandbook to view Mid-State's student handbook, which contains information about admissions, enrollment, appeals processes, services for people with disabilities, financial aid, graduation, privacy, Mid-State's Student Code of Conduct, and technology.

ADDITIONAL COURSES AS NEEDED

The following courses may be recommended or required if the student does not achieve minimum Accuplacer scores.

College Reading and Writing 1

108311043 credits

Provides learners with opportunities to develop and expand reading and writing skills to prepare for college-level academic work. Students will employ critical reading strategies to improve comprehension, analysis, and retention of texts. Students will apply the writing process to produce well-developed, coherent, and unified written work.

Pre-Algebra

108341093 credits

Provides an introduction to algebra. Includes operations on real numbers, solving linear equations, percent and proportion, and an introduction to polynomials and statistics. Prepares students for elementary algebra and subsequent algebra-related courses.

Please Note:

- This curriculum sequence is only for student planning. Actual student schedules will vary depending on course availability.
- Program completion time may vary based on student scheduling and course availability. For details, go to mstc.edu/schedule.

SAMPLE FULL-TIME CURRICULUM OPTION

Term		15 credits
10457119	Fabrication Fundamentals 1	1
10457120	Fabrication Fundamentals 2	1
10623106	Intro to AutoCAD	1
10623114	Intro to Inventor	1
31442317	Print Reading for Welding	1
31442323	GMAW: Introduction	2
31442324	GMAW: Stainless & Aluminum	2
31442325	FCAW: Introduction	2
31442413	Technical Math for Welding and Fabrication	1
31457400	Measurement and Layout	1
31457404	Material Handling for Metal Fabrication	1
31462318	Safety for Industrial Trades ☑	1

Term		14 credits
10442115	Welding Fabrication Techniques	2
31442314	Gas Tungsten Arc Welding: Intro	2
31442316	Metallurgy for Welding	1
31442322	Robotic Welding	2
31457401	Metal Fabrication for Pipe	2
31457402	Metal Fabrication for Plate	2
31457403	CNC Programming and Operation	1
31462302	Machine Shop Foundations	2

Total credits 29

SAMPLE PART-TIME CURRICULUM OPTION

Term		7 credits
10623106	Intro to AutoCAD	1
31442317	Print Reading for Welding	1
31442323	GMAW: Introduction	2
31442324	GMAW: Stainless & Aluminum	2
31457400	Measurement and Layout	1
31457404	Material Handling for Metal Fabrication	1
31462318	Safety for Industrial Trades ☑	1

Term		8 credits
31442316	Metallurgy for Welding	1
31457401	Metal Fabrication for Pipe	2
31457402	Metal Fabrication for Plate	2
31457403	CNC Programming and Operation	1
31462302	Machine Shop Foundations	2

Term		8 credits
10457119	Fabrication Fundamentals 1	1
10457120	Fabrication Fundamentals 2	1
10623114	Intro to Inventor	1
31442325	FCAW: Introduction	2
31442413	Technical Math for Welding and Fabrication	1

Term		6 credits
10442115	Welding Fabrication Techniques	2
31442314	Gas Tungsten Arc Welding: Intro	2
31442322	Robotic Welding	2

Total credits 29

COURSE DESCRIPTIONS

CNC Programming and Operation

31457403 1 credit

Introduces fundamental concepts of CNC programming as related to metal fabrication. Learners apply concepts by creating and running simple programs with a welding robot, thermal shape-cutting system, and a press brake.

Fabrication Fundamentals 1

10457119..... 1 credit

An introduction to structural shapes and sheet metal fabrication. Presents fabrication techniques, metal selection, and layout, cutting, bending, drilling, threading, and joining using manual equipment and techniques. Information is presented to the student and followed up with lab activities to provide a hands-on experience. Emphasizes developing an understanding of the tools, techniques, safe work habits, and application of sheet metal fabrication skills.

Fabrication Fundamentals 2

10457120..... 1 credit

An introduction to plate steel and heavy fabrication. Presents fabrication techniques using heavy fabrication equipment. CNC Cutting, Plate and Tube bending, Sawing and Shearing equipment will be presented and followed up with lab activities to provide a hands-on experience. Emphasizes developing an understanding of the equipment, techniques, safe work habits, and application of heavy metal fabrication skills.

FCAW: Introduction

31442325 2 credits

In this course, learners will develop skills in the flux core arc welding (FCAW) process by creating weldments across various welding positions. They will gain a thorough understanding of electrode types, flux compositions, and shielding gases suitable for different materials. Additionally, learners will practice reading weld symbols and interpreting written welding procedures, enhancing their technical comprehension and hands-on abilities in FCAW techniques. This course prepares students with foundational knowledge and skills for effectively working with flux core welding in real-world applications.

Corequisite: GMAW: Stainless & Aluminum 31442324

GMAW: Introduction

31442323 2 credits

Learners will focus on the gas metal arc welding (GMAW) process to create weldments on mild steel sheet metals and plates. They will work in various welding positions, applying axial spray, pulse spray, and short circuit transfer modes. Emphasis will be placed on interpreting written welding procedures and understanding weld symbols, ensuring learners develop a foundational grasp of essential welding techniques and standards used in the industry.

Gas Tungsten Arc Welding: Intro

31442313 2 credits

Learners will use GTAW processes to weld common production welding joints with various materials.

GMAW: Stainless & Aluminum

31442324 2 credits

In this advanced gas metal arc welding (GMAW) course, learners will concentrate on welding stainless steel and aluminum sheet metals and plates, using specialized techniques. They will learn to differentiate and select appropriate electrodes and shielding gases for different base metals, as well as accurately adjust parameters for optimal results. The course emphasizes mastery of axial spray, pulse spray, and short circuit transfer modes, tailored to the specific properties of stainless steel and aluminum. Through hands-on practice, learners will deepen their understanding of advanced GMAW processes and their applications in diverse welding scenarios.

Corequisite: GMAW: Introduction 31442323

Intro to AutoCAD

10623106 1 credit

Learners will develop practical approaches to constructing basic 2D drawings in AutoCAD software by drawing, modifying, and assigning appropriate layer properties. Learners will also analyze length and area of shapes drawn in AutoCAD, summarize details through dimensions and annotations added to the drawings, and format the drawings for printing. Prior experience with computers is recommended.

Intro to Inventor

10623114 1 credit

Learners will create 3D models in Inventor using a variety of feature and modify tools, analyze the volume of the models, and apply a material to determine weight of the finished product. Learners will generate 2D representations of the 3D model in appropriate views, and add dimensions and annotations before formatting drawings to print out. Prior experience with computers is recommended.

Machine Shop Foundations

31462302 2 credits

This introductory course in machining will provide basic content related to shop safety, identification of common machine tools, their functions, and the basic processes they perform, and lab activities which will include basic setup and operations.

Material Handling for Metal Fabrication

31457404 1 credit

This course prepares students with the skills and knowledge necessary for safe and effective material handling in metal fabrication environments. Students will learn to identify and inspect rigging equipment, ensuring proper safety standards are met. They will gain hands-on experience in safely rigging loads and will demonstrate safe operation techniques for cranes and forklifts. By the end of the course, students will be equipped to handle materials efficiently and safely, reducing risks and improving workplace safety in fabrication settings.

COURSE DESCRIPTIONS

Math for Manufacturing

324203202 credits

Studies Welding and Fabrication problems involving calculations with fractions, decimals, percentages, measurements and conversions. Includes work with the metric system, measurement conversion, shapes, formulas for circumference area and volume and use of a scientific calculator. Formulas with application to bending metal are also studied.

Prerequisite: Admission into Precision Machining Technician 3142010 program, Welding program 314421, Gas Tungsten Arc Welding (Stainless Steel) 304427, or consent of instructor.

Measurement and Layout

314574001 credit

An introduction to measurement scales and the different tools used in fabrication. An introduction into the different layout methods used for pipe and plate fabrication incorporating angles, arcs and area.

Metal Fabrication for Pipe

314574012 credits

An introduction into pipe fabrication where students will learn how to use the different machines involved with pipe bending, rolling, coping and cutting. Students will also learn accurate measuring and layout methods pertaining to bending and rolling.

Metal Fabrication for Plate

314574022 credits

An introduction into plate fabrication where students will learn how to use the different machines involved with bending, rolling and cutting plate material. Students will also learn accurate measuring and layout methods involved with bending and rolling of plate material.

Metallurgy for Welding

314423161 credit

Investigates the effects of welding on the mechanical properties of metals. Learners explore hardness, strength, and weldability of various metals. Concepts are applied in various activities including heat treating, hardness testing, and tensile testing.

Print Reading for Welding

314423171 credit

Learners will view, interpret, and create multi-view orthographic projection drawings, print symbols and dimensioning standards.

Robotic Welding

314423222 credits

An introduction into the operation, set-up and uses for robots in the welding industry. Students will learn simple teach pendant techniques, perform CNC basics for making programs and utilizing welding knowledge for proper set-up of the robots, students will perform multiple functions to produce quality weldments performed by the robot.

Safety for Industrial Trades

314623181 credit

This course introduces basic concepts of safety, health, and environmental issues. Hazards and harm reduction protocols are covered, and completion of Occupational Safety and Health Administration (OSHA) 10-hour general industry certification is included in the course.

Technical Math for Welding and Fabrication

314424131 credit

In this course, students will gain essential math skills tailored for welding and fabrication applications, enhancing their accuracy and efficiency in real-world settings. Students will develop proficiency in working with whole numbers, fractions, and decimals, and will perform conversions and calculations in both the imperial and metric systems. They will learn to use common welding measurement tools and calculate important dimensions such as perimeter, circumference, area, and volume for standard shapes like triangles, squares, and circles. Additionally, students will perform calculations for project estimation, design, production analysis, and metal forming processes.

Welding Fabrication Techniques

104421152 credits

Students fabricate parts from prints and weld assemblies with a specified welding process. Cutting and forming may be required prior to assembly. Depending on the size and complexity of the project, students may be asked to work in a team to complete an assignment.

Prerequisite: GMAW: introduction 31442313