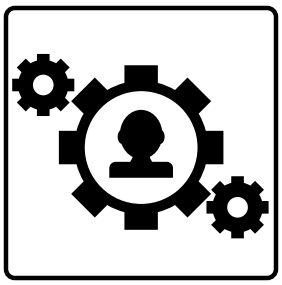

METAL FABRICATION

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

CHECKLIST:
This section will be completed when meeting with your academic advisor.

- ❑ FAFSA (www.fafsa.gov)
- ❑ Financial Aid Form(s)

  Form(s): _____
- ❑ Follow-Up Appointment:

  Where: _____

  When: _____

  With: _____
- ❑ Official Transcripts
  Mid-State Technical College
  Student Services Assistant
  1001 Centerpoint Drive
  Stevens Point, WI 54481
- ❑ Other: _____

  _____

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**.

mstc.edu • 888.575.6782 • TTY: 711

MID-STATE TECHNICAL COLLEGE

ADAMS CAMPUS
401 North Main
Adams, WI 53910

MARSHFIELD CAMPUS
2600 West 5th Street
Marshfield, WI 54449

STEVENS POINT 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

- 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**.

METAL FABRICATION

Technical Diploma • 29 Credits

Start Your Career

- Fabricator
- Metalworker
- Fitter
- Apprenticeship

BACHELOR'S DEGREE OPTIONS

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
10831104 .....3 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
10834109 .....3 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.

SAMPLE FULL-TIME CURRICULUM OPTION

Term		**15 credits**
10442111	Intermediate GMAW/FCAW	3
10457119	Fabrication Fundamentals 1	1
10457120	Fabrication Fundamentals 2	1
10623106	Intro to AutoCAD	1
10623114	Intro to Inventor	1
31442313	Gas Metal Arc Welding: Introduction	3
31442317	Print Reading for Welding	1
31457400	Measurement and Layout	1
31462318	Safety for Industrial Trades	1
32420320	Math for Manufacturing	2

Term		**14 credits**
10442115	Welding Fabrication Techniques	2
31442314	GTAW: Introduction	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

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 PART-TIME CURRICULUM OPTION

Term		**7 credits**
10623106	Intro to AutoCAD	1
31442313	Gas Metal Arc Welding: Introduction	3
31442317	Print Reading for Welding	1
31457400	Measurement and Layout	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**
10442111	Intermediate GMAW/FCAW	3
10457119	Fabrication Fundamentals 1	1
10457120	Fabrication Fundamentals 2	1
10623114	Intro to Inventor	1
32420320	Math for Manufacturing	2

Term		**6 credits**
10442115	Welding Fabrication Techniques	2
31442322	Robotic Welding	2
31442314	GTAW: Introduction	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.

Gas Metal Arc Welding: Introduction
31442313 ..... 3 credits
Learners will use GMAW processes to weld on steel sheet metals and plates, focusing on axial spray, pulse spray and short circuit modes of transfer. Learners will understand written welding procedures and weld symbols and weld in several positions.

Intermediate GMAW/FCAW
10442111 ..... 3 credits
Builds skills with the GMAW process and performing welds on stainless steel and aluminum sheet metal and plate. Students are able to differentiate and select proper electrodes and shielding gases, and properly adjust parameters. Emphasizes axial spray, pulse spray, and short circuit mode of transfer depending on base metal. Students learn about and practice the FCAW process, including types of electrodes, fluxes, and shielding gases used in these processes. Students are able to weld in several positions, read some basic weld symbols, and have a basic understanding of written welding procedures.
Prerequisite: Gas Metal Arc Welding (GMAW) 10442110

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.

Math for Manufacturing
32420320 ..... 2 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
31457400 ..... 1 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
31457401 ..... 2 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
31457402 ..... 2 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.

COURSE DESCRIPTIONS

Metallurgy for Welding
31442316 ..... 1 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
31442317 ..... 1 credit
Learners will view, interpret, and create multi-view orthographic projection drawings, print symbols and dimensioning standards.

Robotic Welding
31442322 ..... 2 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
31462318 ..... 1 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.

Welding Fabrication Techniques
10442115 ..... 2 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.