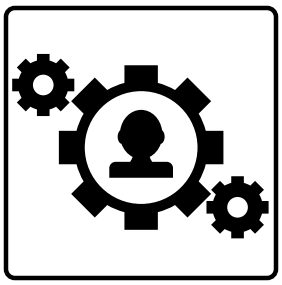

WELDING

Technical Diploma
Program Code: 31-442-1
Total Credits: 27-29

The Welding program at Mid-State prepares graduates for a wide variety of welding jobs in production, maintenance, construction, manufacturing, and servicing industries. You will receive hands-on instruction and practice in a number of welding processes, including shielded metal arc, gas tungsten arc, gas metal arc, submerged arc, oxyacetylene cutting, plasma arc, and arc-air cutting. You will also become familiar with various types of metals, fabrication of metals, and welding under industry codes. Successful completion of this program prepares you to take welding certification tests.

Mid-State's Welding program courses prepare students for numerous state and national certifications. None is required to complete the program; there are additional costs for testing/certification. The College does not guarantee its curriculum matches the requirements for preparation, examinations, or licensure for other states.

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**.

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**.

GAS METAL ARC WELDING (GMAW)

Certificate • 5 Credits

For more information and additional opportunities, visit **mstc.edu/career-accelerator**.

WELDING

Technical Diploma • 27-29 Credits

Start Your Career

- Construction Welder
- Fabricator Maintenance Welder
- Production Line Welder
- Apprenticeship

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
- Metal Fabrication
- Precision Machining Technician
- Stainless Steel Welding

APPRENTICESHIP OPPORTUNITIES

- Ironworker Apprenticeship

OUTCOMES

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

- Demonstrate industry-recognized safety practices.
- Interpret welding drawings.
- Produce shielded metal arc welds (SMAW).
- Produce gas metal arc welds (GMAW).
- Produce flux core welds.
- Produce gas tungsten arc welds (GTAW).
- Perform cutting operations.

TECHNICAL SKILLS ATTAINMENT

The Wisconsin Technical College System (WTCS) has implemented a requirement that all technical colleges measure outcomes attained by students. This requirement is called Technical Skills Attainment (TSA). The main objective of TSA is to ensure graduates have the technical skills needed by employers. Students are notified of TSA reporting in their final few courses of the program.

PROTECTIVE CLOTHING

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

NOTES:

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.

GRADUATION REQUIREMENT

The GPS for Student Success course is required for all Mid-State program students and is recommended to be completed before obtaining 12 credits. (Not counted in the total credit value for this program.) Some students are exempt from this requirement. Please see your program advisor for more information.

GPS for Student Success
10890102 .....1 credit
Integrate necessary skills for student success by developing an academic plan, identifying interpersonal attributes for success, adopting efficient and effective learning strategies, and utilizing Mid-State resources, policies, and processes. This course is recommended to be completed prior to obtaining 12 credits and is a graduation requirement unless you receive an exemption from your program advisor.

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		13-15 credits
10457119	Fabrication Fundamentals 1	1
31442311	Weld Testing for GMAW & FCAW	1
31442315	Inspections and Testing in Welding	1
31442317	Print Reading for Welding	1
31442320	Welding Foundations 1 ✎	1
31442323	GMAW: Introduction	2
31442324	GMAW: Stainless & Aluminum	2
31442325	FCAW: Introduction	2
31442413	Technical Math for Welding and Fabrication	1
	-OR-	
10804107	College Mathematics ✎	3
31462318	Safety for Industrial Trades ✎	1

Term		14 credits
10442102	Intermediate GTAW (TIG) **-OR-**	
30442105	Intermediate TIG (Stainless)	2
10442103	Advanced GTAW (TIG)	
	-OR-	
30442106	Advanced TIG (Stainless)	
	-OR-	
10442115	Welding Fabrication Techniques	2
10457120	Fabrication Fundamentals 2	1
31442314	Gas Tungsten Arc Welding: Introduction **-OR-**	
30442104	Basic TIG (Stainless)	2
31442316	Metallurgy for Welding	1
31442319	Shielded Metal Arc Welding: Introduction	2
31442321	Welding Foundations 2	1
31442322	Robotic Welding	2
31442412	Weld Testing for SMAW & GTAW	1

Total credits 27-29

✎ This course has options available to receive credit for prior learning (CPL) or work experience. Visit the website at **mstc.edu/cpl** or contact your advisor for details.

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
10457119	Fabrication Fundamentals 1	1
31442320	Welding Foundations 1 ✎	1
31442323	GMAW: Introduction	2
31442324	GMAW: Stainless & Aluminum	2
31462318	Safety for Industrial Trades ✎	1

Term		7 credits
10442102	Intermediate GTAW (TIG) **-OR-**	
30442105	Intermediate TIG (Stainless)	2
10457120	Fabrication Fundamentals 2	1
31442314	Gas Tungsten Arc Welding: Introduction **-OR-**	
30442104	Basic TIG (Stainless)	2
31442316	Metallurgy for Welding	1
31442321	Welding Foundations 2	1

Term		6-8 credits
31442311	Weld Testing for GMAW & FCAW	1
31442315	Inspections and Testing in Welding	1
31442317	Print Reading for Welding	1
31442325	FCAW: Introduction	2
31442413	Technical Math for Welding and Fabrication	1
	-OR-	
10804107	College Mathematics ✎	3

Term		7 credits
10442103	Advanced GTAW (TIG)	
	-OR-	
30442106	Advanced TIG (Stainless)	
	-OR-	
10442115	Welding Fabrication Techniques	2
31442319	Shielded Metal Arc Welding: Introduction	2
31442322	Robotic Welding	2
31442412	Weld Testing for SMAW & GTAW	1

Total credits 27-29

MULTIPLE MEASURES	
Multiple Measures Writing (MMW): High school GPA of 2.6 and successful completion of 2.0 credits of high school writing courses with a "C" or better	**Multiple Measures Reading (MMR):** High school GPA of 2.6 and successful completion of 2.0 credits of high school literature courses with a "C" or better
Multiple Measures Math 1 (MMM_1): High school GPA of 2.6 and successful completion of 1.0 credits of high school math (Algebra 1 or equivalent) with a "C" or better	**Multiple Measures Math 2 (MMM_2):** High school GPA of 2.6 and successful completion of 2.0 credits of high school math including Algebra 1 and Algebra 2 with a "C" or better
Multiple Measures Science 1 (MMS_1): High school GPA of 2.6 and successful completion of 1.0 credits of high school lab science course with a "C" or better	**Multiple Measures Science 2 (MMS_2):** High school GPA of 2.6 and successful completion of 1.0 credits of high school chemistry with a "C" or better

Past high school and college transcripts are used in making course placement decisions.

COURSE DESCRIPTIONS

Advanced GTAW (TIG)
10442103 .....2 credits
Students learn complete penetration stainless steel pipe welds in the 5G and 6G positions.
Corequisite: Intermediate GTAW (TIG) 10442102

Advanced TIG (Stainless)
30442106 .....2 credits
Students learn advanced GTAW processes through the completion of stainless steel pipe weldments in the 5G and 6G positions.
Corequisite: Intermediate TIG (Stainless) 30442105

Basic TIG (Stainless)
30442104 .....2 credits
An introduction to the gas tungsten arc welding (GTAW) process commonly known as TIG. Topics include study and application of necessary safety and care of equipment and supplies. The student develops skills with the common production welding joints and materials all completed on stainless steel.

College Mathematics
10804107 .....3 credits
This course is designed to review and develop fundamental concepts of mathematics in the areas of algebra, geometry, trigonometry, measurement and data. Algebra topics emphasize simplifying algebraic expressions, solving linear equations and inequalities with one variable, solving proportions and percent applications. Geometry and trigonometry topics include; finding areas and volumes of geometric figures, applying similar and congruent triangles, applying Pythagorean Theorem, and solving right triangles using trigonometric ratios. Measurement topics emphasize the application of measurement concepts and conversion techniques within and between U.S. customary and metric system to solve problems. Data topics emphasize data organization and summarization skills, including: frequency distributions, central tendency, relative position and measures of dispersion. Special emphasis is placed on problem solving, critical thinking and logical reasoning, making connections, and using calculators.
Prerequisite: High School GPA of 2.6 and MMM_1 or Accuplacer Arithmetic of 250 and QAS 234 or ACT Math score of 17 or Pre-Algebra 10834109 with a "C" or better

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

Gas Tungsten Welding: Introduction
31442314.....2 credits
An introduction to the gas tungsten arc welding (GTAW) process commonly known as TIG, including the necessary safety and care of equipment and supplies. The student develops skills with the common production welding joints and materials.

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.

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

COURSE DESCRIPTIONS

Inspections and Testing in Welding
31442315 ..... 1 credit
Learners will administer various tests to measure weld quality and conformance to welding codes. In addition to administering etch, bend and break tests on welds, students will implement visual inspection, dye penetrant testing and magnetic particle testing.

Intermediate GTAW (TIG)
10442102 ..... 2 credits
In this course students weld in the horizontal and vertical positions on stainless steel and aluminum. Pulsed current is applied to stainless steel weldments. Complete penetration groove welds in stainless steel are practiced and evaluated.
Corequisite: Gas Tungsten Arc Welding: Introduction 31442314

Intermediate TIG (Stainless)
30442105..... 2 credits
Intermediate GTAW weldments created in the horizontal and vertical positions on stainless steel. Pulsed current is applied to stainless steel weldments. Complete penetration groove welds in stainless steel are practiced and evaluated.
Corequisite: Basic TIG (Stainless) 30442104.

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
Students study print format, line types, orthographic views, dimensioning, welding symbols, and bill of materials. Students apply concepts by creating and fabricating from prints in individual and group activities.

Robotic Welding
31442322 ..... 2 credits
An introduction into the operation, setup 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 setup of the robots. Students will perform multiple functions to produce quality weldments performed by the robot.

Safety for Industrial Trades
31462318 ..... 1 credit
Provides an overview of safety, health, and environmental issues as they relate to industry. Various types of hazards and the controls and equipment used to reduce risks from hazards are discussed. Focuses on understanding the Occupational Safety and Health Administration (OSHA) and its function as well as other regulatory and enforcement agencies associated with industrial safety, health, and the environment.

Shielded Metal Arc Welding: Introduction
31442315 ..... 2 credits
Begins to build the knowledge and skills of the SMAW process commonly known as stick welding. Students are able to weld in several positions, read some basic weld symbols, and have a basic understanding of written welding procedures.
Co-req Welding Foundations 2 31442321

Technical Math for Welding and Fabrication
31442413 ..... 1 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, preparing them to apply math confidently and effectively in welding and fabrication environments.

Weld Testing for GMAW & FCAW
31442311 ..... 1 credit
Learners will execute weldments, in multiple positions, leading to bend tests for the GMAW and FCAW processes. Weldments will be certified and conducted to AWS (American Welding Society) standards, meeting requirements for Wisconsin Department of Safety and Professional Services certification. Upon successful completion of bend tests, learners will choose one process to submit for certification.

Weld Testing for SMAW & GTAW
31442412 ..... 1 credit
Learners will execute weldments, in multiple positions, leading to bend tests for the SMAW and GTAW processes. Weldments will be certified and conducted to AWS (American Welding Society) standards, meeting requirements for Wisconsin Department of Safety and Professional Services certification. Upon successful completion of bend tests, learners will choose one process to submit for certification.

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.

Welding Foundations 1
31442320 ..... 1 credit
An introduction to fundamental welding techniques with an emphasis on safe work habits that covers the processes of FCAW, GMAW, and OXY-Fuel cutting. Classroom instruction paired with lab activities are designed to provide fundamental skills in each of the welding processes covered in the class.

Welding Foundations 2
31442321 ..... 1 credit
An introduction to fundamental welding techniques with an emphasis on safe work habits that covers the processes of GTAW, SMAW and Plasma cutting. Classroom instruction pared with lab activities are designed to provide fundamental skills in each of the welding processes covered in the class.