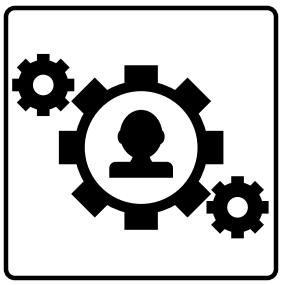

WELDING

Technical Diploma
Program Code: 31-442-1
Total Credits: 28-29

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**.

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: _____

  _____

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 • 6 Credits

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

WELDING

Technical Diploma • 28-29 Credits

Start Your Career

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

BACHELOR'S DEGREE OPTIONS

For more information and additional opportunities, visit **mstc.edu/transfer**.

OTHER OPTIONS

RELATED PROGRAMS

- Industrial Mechanical Technician
- Manufacturing Operations Management
- Metal Fabrication
- Precision Machining Technician
- Stainless Steel Welding

APPRENTICESHIP OPPORTUNITIES

- Ironworker Apprenticeship

PROGRAM 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 program 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.
Prerequisite: Accuplacer Math score of 65, Accuplacer Algebra score of 30, ABE Math Prep V 76854785 and ABE Math Prep VI 76854786 with a grade of "S." (Note: ABE Math Prep V and VI courses cannot be used to satisfy program completion requirements at Mid-State.)

SAMPLE FULL-TIME CURRICULUM OPTION

Term		14-15 credits
32420320	Math for Manufacturing	2
	-or-	
10804107	College Mathematics ✎	3
31442313	Gas Metal Arc Welding: Introduction	3
31442314	Gas Tungsten Arc Welding: Introduction **-or-**	
30442104	Basic TIG (Stainless)	2
31442315	Inspections and Testing in Welding	1
31442317	Print Reading for Welding	1
31442319	Shielded Metal Arc Welding: Introduction	2
31442320	Welding Foundations 1	1
31442321	Welding Foundations 2	1
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)	2
10442111	Intermediate GMAW/FCAW	3
31442316	Metallurgy for Welding	1
10457119	Fabrication Fundamentals 1	1
10457120	Fabrication Fundamentals 2	1
31442322	Robotic Welding	2
31442311	Weld Testing for GMAW & FCAW	1
31442412	Weld Testing for SMAW & GTAW	1

Total credits 28-29

✎ 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		8 credits
31442314	Gas Tungsten Arc Welding: Introduction **-or-**	
30442104	Basic TIG (Stainless)	2
31442317	Print Reading for Welding	1
31442319	Shielded Metal Arc Welding: Introduction	2
31442320	Welding Foundations 1	1
31442321	Welding Foundations 2	1
31462318	Safety for Industrial Trades ✎	1

Term		7 credits
10442102	Intermediate GTAW (TIG) **-or-**	
30442105	Intermediate TIG (Stainless)	2
10457119	Fabrication Fundamentals 1	1
10457120	Fabrication Fundamentals 2	1
31442316	Metallurgy for Welding	1
31442322	Robotic Welding	2

Term		6-7 credits
31442313	Gas Metal Arc Welding: Introduction	3
31442315	Inspections and Testing in Welding	1
32420320	Math for Manufacturing	2
	-or-	
10804107	College Mathematics ✎	3

Term		7 credits
10442103	Advanced GTAW (TIG) ✎ **-or-**	
30442106	Advanced TIG (Stainless)	2
10442111	Intermediate GMAW/FCAW	3
31442311	Weld Testing for GMAW & FCAW	1
31442412	Weld Testing for SMAW & GTAW	1

Total credits 28-29

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
Designed to review and develop fundamental concepts of mathematics pertinent to the areas of: 1) arithmetic and algebra; 2) geometry and trigonometry; and 3) probability and statistics. Special emphasis is placed on problem solving, critical thinking and logical reasoning, making connections, and using calculators. Topics include performing arithmetic operations and simplifying algebraic expressions, solving linear equations and inequalities in one variable, solving proportions and incorporating percent applications, manipulating formulas, solving and graphing systems of linear equations and inequalities in two variables, finding areas and volumes of geometric figures, applying similar and congruent triangles, converting measurements within and between US and metric systems, applying Pythagorean Theorem, solving right and oblique triangles, calculating probabilities, organizing data and interpreting charts, calculating central and spread measures, and summarizing and analyzing data.
Prerequisite: High School GPA of 3.0 or Accuplacer Arithmetic of 250 and QAS 234 or ACT of 17 or Pre-Algebra 834109 with a grade of "C" or better or equivalent. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements.

Gas Metal Arc Welding: Introduction
31442313 .....3 credits
In this course, you develop skills of welding on steel sheet metals and plates using the GMAW process. Emphasis is placed on axial spray, pulse spray, and short circuit mode of transfer. Upon completion of this course, the student is able to weld in several positions, read basic weld symbols, and have an understanding of written welding procedures.

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.

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.

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: Introduction 31442313

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.

COURSE DESCRIPTIONS

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 program 314209, Welding program 314421, Gas Tungsten Arc Welding (Stainless Steel) program 304427, or consent of instructor

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.

Weld Inspections and Testing
10442163.....1 credit
Emphasizes measurement of weld defects and assessment of weld quality conformance to common welding codes. Students conduct etch tests, bend tests, and break tests on welds. Visual inspection, dye penetrant testing, and magnetic particle testing are practiced.

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 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.