

# welding

## Technical Diploma Program Code: 31-442-1 Total Credits: 33-34

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 and brazing, 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](http://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](http://mstc.edu/advising).

### CHECKLIST:

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

- FAFSA ([www.fafsa.gov](http://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: \_\_\_\_\_  
\_\_\_\_\_

**mstc.edu**  
**888.575.6782**



**ADAMS CAMPUS**  
401 North Main  
Adams, WI 53910

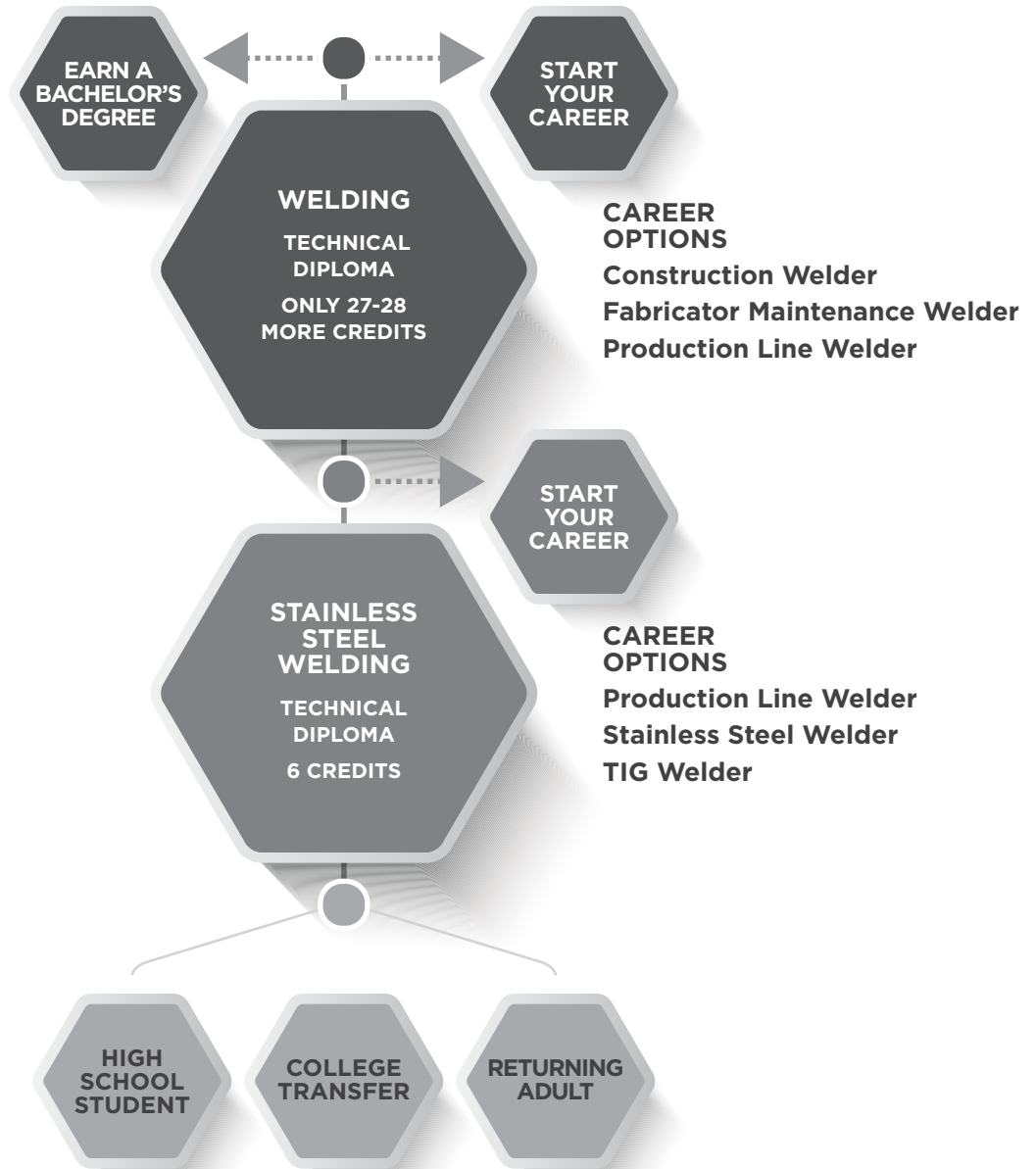
**MARSHFIELD CAMPUS**  
2600 West 5th Street  
Marshfield, WI 54449

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

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

## BACHELOR'S DEGREE OPTIONS

For more information and additional opportunities, visit [mstc.edu/transfer](http://mstc.edu/transfer).



College Credit • Dual Credit • Military Experience • Work Experience  
Learn about Credit for Prior Learning at [mstc.edu/cpl](http://mstc.edu/cpl).

**BEGIN AT ANY POINT  
IN THE PATHWAY**

## OTHER OPTIONS

### RELATED PROGRAMS

- Industrial Mechanical Technician
- Machine Tool Technician
- Manufacturing Operations Management

### 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:

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## STUDENT HANDBOOK

Visit [mstc.edu/studenthandbook](http://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 must be completed prior to obtaining 12 credits and as a graduation requirement.

## ADDITIONAL COURSES AS NEEDED

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

### Intro to College Reading

**10838104 .....2 credits**

Provides learners with the opportunities to develop and expand reading skills, including comprehension and vocabulary skills. Learners apply reading skills to academic tasks and read to acquire information from a variety of sources.

### Intro to College Writing

**10831103 .....3 credits**

Introduces basic principles of composition, including organization, development, unity, and coherence in paragraphs and multi-paragraph documents. The purpose of this course is to prepare students for successful entry into required program courses. This course is tuition bearing and under certain circumstances may qualify for financial aid. This course cannot be used to satisfy program completion requirements at Mid-State.

*Prerequisite: Accuplacer Sentence Skills score of 60 or equivalent. Proficiency in word processing skills recommended.*

### 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**

<b>Term</b>		<b>17-18 credits</b>
10442117	Welding Fundamentals 1	1
10442118	Welding Fundamentals 2	1
10442101	Basic GTAW (TIG)	2
10442110	Gas Metal Arc Welding (GMAW)	3
10442112	Welding Print Reading	2
10442130	Shielded Metal Arc Welding (SMAW)	2
10442132	Metal Cutting Welding	2
10462107	Industrial Safety	2
10804107	College Mathematics	3
	<b>-or-</b>	
32420320	Math for Manufacturing	2
<b>16 credits</b>		
10442102	Intermediate GTAW (TIG)	2
10442103	Advanced GTAW (TIG) <b>-or-</b>	
10442115	Welding Fabrication Techniques	2
10442111	Intermediate GMAW/FCAW	3
10442159	Welding Metallurgy	2
10442163	Weld Inspections and Testing	1
10457119	Fabrication Fundamentals 1	1
10457120	Fabrication Fundamentals 2	1
10462132	Machine Shop Fundamentals	3
10623106	Intro to AutoCAD	1
<b>Total credits 33-34</b>		

## 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/classfinder](http://mstc.edu/classfinder).

**SAMPLE PART-TIME CURRICULUM OPTION**

<b>Term</b>		<b>9 credits</b>
10442117	Welding Fundamentals 1	1
10442118	Welding Fundamentals 2	1
10442101	Basic GTAW (TIG)	2
10442110	Gas Metal Arc Welding (GMAW)	3
10462107	Industrial Safety	2
<b>9 credits</b>		
10442111	Intermediate GMAW/FCAW	3
10442112	Welding Print Reading	2
10442130	Shielded Metal Arc Welding (SMAW)	2
10442132	Metal Cutting Welding	2
<b>7-8 credits</b>		
10442102	Intermediate GTAW (TIG)	2
10442159	Welding Metallurgy	2
10442163	Weld Inspections and Testing	1
10804107	College Mathematics	3
	<b>-or-</b>	
32420320	Math for Manufacturing	2
<b>8 credits</b>		
10442103	Advanced GTAW (TIG) <b>-or-</b>	
10442115	Welding Fabrication Techniques	2
10457119	Fabrication Fundamentals 1	1
10457120	Fabrication Fundamentals 2	1
10462132	Machine Shop Fundamentals	3
10623106	Intro to AutoCAD	1
<b>Total credits 33-34</b>		

# 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*

## Basic GTAW (TIG)

**10442101 .....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.

## 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.*

## 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 (GMAW)

**10442110 .....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.

## Industrial Safety

**10462107 .....2 credits**

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.

## 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*

## 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: Basic GTAW (TIG) 10442101*

## 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.

## Machine Shop Fundamentals

**10462132.....3 credits**

Students participating in this class will be introduced to common machine tools and their functions. Classroom activities and hands-on lab exercises will be used to introduce participants to some of the most common applications in machining. Lab activities will introduce students to shop safety and identification of machine tools. Students will also gain understanding of the basic processes performed with different machine tools and basic machine set up 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 Machine Tool Technician program 324201, Welding program 314421, Gas Tungsten Arc Welding (Stainless Steel) 304427, or consent of instructor*

## Metal Cutting Welding

**10442132.....2 credits**

Covers oxy-fuel cutting, plasma arc cutting, air-carbon arc cutting, mechanical cutting, and nontraditional cutting. Individual parts are produced using automatic and manual equipment. Both shop and field applications are practiced. The parts may be joined by welding to complete an assembly. Students may work in a team environment to complete assignments. This course is available to Welding program students only.

## Shielded Metal Arc Welding (SMAW)

**10442130 .....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.

## 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.

*Prerequisites: Admission to Welding program 314421 and Intermediate GTAW (TIG) 10442102*

## Welding Fundamentals 1

**10442117 .....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 Fundamentals 2

**10442118 .....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 paired with lab activities are designed to provide fundamental skills in each of the welding processes covered in the class.

## Welding Metallurgy

**10442159.....2 credits**

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.

## Welding Print Reading

**10442112 .....2 credits**

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.