

**Program Number 31-442-1
Technical Diploma • One Term**
ABOUT THE PROGRAM

Discover the wonderful world of welding and fabrication through the use of the three major electrical welding processes. Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), and Gas Tungsten Arc Welding (GTAW). Learners will weld in all positions preparing you for a career in many fields of work, including manufacturing, shipbuilding, custom fabrication and pipe welding.

PROGRAM OUTCOMES

- 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 thermal cutting.

CAREER AND EDUCATION ADVANCEMENT OPPORTUNITIES

Lakeshore credits transfer to over 30 universities. For more information visit lakeshore.edu/future-students/transfer.

ADMISSIONS AND FIRST SEMESTER ENROLLMENT STEPS

- Submit online application.
- Complete the online Student Success Questionnaire.
- Complete Get Started at Lakeshore appointment.

**Submit high school transcripts, college transcripts, and test scores (optional, highly recommended). Official transcripts will be needed for transferring college credit(s) and for financial aid purposes.*

ACADEMIC PREPAREDNESS/FUTURE SEMESTER ENROLLMENT STEPS

If applicable, complete program-specific academic preparedness requirements and enrollment steps prior to enrolling in occupational or core courses. Students will be notified if there is a program waitlist. View the college's program webpage for details: <https://lakeshore.edu/programs-and-courses/career-areas/manufacturing/welding-industrial>.

APPROXIMATE COSTS

\$157.45 per credit tuition (WI resident) plus \$9.45 per credit student activity fee. Material fee varies depending on course. Other fees vary by program. Visit <https://lakeshore.edu/paying-for-college/tuition-and-fees> for details.

FINANCIAL AID

This program is eligible for financial aid. Visit lakeshore.edu/Financial-Aid or talk with your College Recruiter about how to apply for aid.

SPECIAL NOTE

- Accelerate your learning, earn credit for what you know, and get personalized support to reach your goals. The full CBE definition may be found at lakeshore.edu/CBE.
- This program offers flexible start dates throughout the year. All classes meet the American Welding Society requirements.
- Welding program course content prepares students for numerous state and national certifications. None are required to complete the program; there are additional costs for testing/certification.
- This program at Lakeshore College prepares students to obtain credentials to be employed/practice in Wisconsin. The college does not guarantee its curriculum matches the full requirements for preparation, examination, or licensure in other states.

CONTACT

Lakeshore College Recruiter
920.693.1366 • Recruitment@lakeshore.edu

Catalog No.	Class Title	Credit(s)
Term 1		
10442100	Safety and Welding Fundamentals*	1
31442351	Precision Measurement and Layout*	1
31442350	Metal Manufacturing Processes*	1
31442310	SMAW-Flat Position (Stick)*	1
31420325	Manufacturing Math*	1
31442308	Weld Examination*	1
31442320	GMAW-Flat Position (Wire/Mig)*	1
31442322	GMAW-Horizontal Position (Wire/Mig)*	1
31442385	Weld Print 1 Print Fundamentals*	1
31442324	Flux Core Arc-Flat/Horizontal Position*	1
31442312	SMAW-Horizontal Position (Stick)*	1
31442314	SMAW-Vertical Position (Stick)*	1
31442316	SMAW-Overhead Position (Stick)*	1
31442326	Flux Core Arc-Vertical/Overhead Position*	1
		14
Term 2		
31442304	Welding Submerged Arc (SAW)*	1
31442330	GTAW Mild Steel Flat/Horizontal Position*	1
31442332	GTAW Mild Steel Out of Position (Heli-Arc/TIG)*	1
31442334	GTAW Stainless/Aluminum Horizontal Positions*	1
31442336	GTAW Stainless/Aluminum Out of Position*	1
31442343	Weld Print 2 Weld/Welding Symbols*	1
31442318	Pipe Welding Fundamentals*	1
31442340	Welding Advance Process 1*	1
31442342	Welding Advance Process 2*	1
31442357	Welding Fabrication Introduction*	2
10623272	Industrial Professionalism and Skills*	1
10623274	Workplace Employability and Readiness*	1
		13
		TOTAL 27

*CBE delivery only

Curriculum and program acceptance requirements are subject to change. Program start dates vary; check with your Academic Counselor for details. The tuition and fees are approximate based on 2026-2027 rates and are subject to change prior to the start of the academic year.

FLUX CORE ARC - VERTICAL/OVERHEAD POSITION...teaches the learner to use safe shop work practices while creating welds in the vertical and overhead positions. Learners will create fillet and grooves welds in vertical and overhead positions. Students will be introduced to pipe welding while using the FCAW welding process. COREQUISITE: 31442324 Flux Core Arc-Flat/Horizontal Position

FLUX CORE ARC-FLAT/HORIZONTAL (WIRE/MIG)...will have learners demonstrate safe shop working practices while welding fillet welds in flat and horizontal positions using the FCAW welding process. Learners will perform single bevel groove welds and V-groove welds in flat and horizontal positions using the FCAW, and will perform groove welds with and without backing material. COREQUISITE: 31442322 GMAW-Horizontal Position (Wire/Mig)

GMAW-FLAT POSITION (WIRE/MIG)...prepares the learner to demonstrate safe shop work practices; learners will perform set up and shut down of GMAW and MCAW equipment; weld mild steel using the GMAW and MCAW welding processes, and weld in the flat position using the GMAW process. PREREQUISITE: 31442300 Welding Intro or COREQUISITE: 10442100 Safety and Welding Fundamentals or 31442346 Industrial Maint Welding Intro or 31442345 Auto Servicing Welding

GMAW-HORIZONTAL POSITION (WIRE/MIG)...will use safe shop work practices while producing 3/4" fillet welds using the GMAW and MCAW welding processes and 1/4" fillet welds while welding tube to plate in the horizontal position. Learners will produce groove weldments in flat and horizontal positions, using .035 hard wire, .052 Metal Core and Metal electrode wires. COREQUISITE: 31442320 GMAW-Flat Position (Wire/Mig)

GTAW MILD STEEL FLAT/HORIZONTAL POSITION...teaches the learner to use safe shop work practices while creating welds in the flat and horizontal positions. Learners will create fillet and grooves welds in flat and horizontal positions on mild steel while using the GTAW welding process. PREREQUISITE: 31442300 Welding Intro or COREQUISITES: 10442100 Safety and Welding Fundamentals or 31442346 Industrial Maint Welding Intro or 31442345 Auto Servicing Welding

GTAW MILD STEEL OUT OF POSITION...teaches the learner to use safe shop work practices while creating welds in the vertical and overhead positions. Learners will create fillet and grooves welds in vertical and overhead positions on mild steel while using the GTAW welding process; Learners will be introduced to the GTAW Pulse welding process while welding mild steel in the 2F position. COREQUISITE: 31442330 GTAW Mild Steel Flat/Horizontal Position

GTAW STAINLESS/ALUMINUM HORIZONTAL POSITIONS...teaches the learner to use safe shop work practices while creating welds in the flat and horizontal positions. Learners will create fillet and grooves welds in flat and horizontal positions on Stainless Steel and Aluminum while using the GTAWP/GTAW welding process. The learner will also learn how to minimize oxidation in stainless steel during the welding process, welding thin SST in the 1G & 2G positions and proper food grade post weld cleanup to these joints. COREQUISITE: 31442332 GTAW Mild Steel Out of Position (Heli-Arc/TIG)

GTAW STAINLESS/ALUMINUM OUT OF POSITION...teaches the learner to use safe shop work practices while creating welds in the vertical and overhead positions. Learners will create fillet and grooves welds in vertical and overhead positions on Stainless Steel and Aluminum while using the GTAWP/GTAW welding process. Learners will be introduced to a welding technique called "walking the cup" and will make fillet welds in the 1F position on 1/4" mild steel. COREQUISITE: 31442334 GTAW Stainless/Aluminum Horizontal Positions

INDUSTRIAL PROFESSIONALISM AND SKILLS...introduces students in manufacturing and trade programs to essential workplace communication and professional skills. Students will develop effective verbal and written communication techniques and enhance teamwork and problem-solving abilities. Workplace professionalism and time management skills are taught. Students will prepare to communicate effectively, work collaboratively, and demonstrate professional behaviors. Required in-person Instructor Connection time ensures personalized guidance.

MANUFACTURING MATH...prepares the learner to use scientific calculators for the applications of common fraction and mixed number problems, decimal problems, inch and metric conversion problems, basic percentage problems, powers and roots, and pre-algebra problems.

METAL MANUFACTURING PROCESSES...prepares the learner to communicate using proper terminology that is used in industry as it pertains to the use of hand/power tools and measurement. The learner will demonstrate good safety practices while in a workplace environment, demonstrate the proper use of hand and power tools. The learner will complete steel fabrications using hand/power tools and classify and install industrial fasteners. The learner will be introduced to material handling operations by using the overhead crane and forklift.

PIPE WELDING FUNDAMENTALS...teaches the learner to use safe shop work practices while creating welds as it pertains to pipe welding. The learner will weld circumferential padding plates and groove welds in the flat position. Students will make 1/4" and 3/8" fillets in the 2F position while using the SMAW, FCAW and GTAW welding processes. Learners will weld T, Y, K connection welds in the flat and horizontal positions while using the SMAW, GMAW, FCAW and GTAW welding processes. COREQUISITES: 31442326 Flux Core Arc-Vertical/Overhead Position, 31442316 SMAW-Overhead Position (Stick), and 31442336 GTAW Stainless/Aluminum Out of Position

PRECISION MEASUREMENT AND LAYOUT...prepares the learner to communicate proper measurement terminology that is used in industry; will develop safety practices for the workplace while using measuring equipment; proper use of measuring equipment and obtain measurement readings from Measuring equipment; layout steel fabrication using hand measuring devices and layout equipment. The learner will inspect and analyze a variety of steel fabrications while using measuring equipment.

SAFETY AND WELDING FUNDAMENTALS...introduces the learner to the world of welding, weld shop safety practices, welding terminology, and welding machine setup to industry standards. Learners will be introduced to the three major welding processes: SMAW, GMAW, and GTAW and will build skills welding with each process in the flat and horizontal positions while using the common welding joints found in industry. The learner will process material using the two major handheld cutting processes - Oxyfuel and PAC.

SMAW-FLAT POSITION (STICK)...prepares the learner to demonstrate safe shop work practices; make bead on plate welds on mild steel; make padding plate welds on mild steel; make fillet welds in 3/8" mild steel plate in the flat position; and make groove welds in mild steel plate. PREREQUISITE: 31442300 Welding Intro or COREQUISITE: 10442100 Safety and Welding Fundamentals or 31442346 Industrial Maint Welding Intro or 31442345 Auto Servicing Welding.

SMAW-HORIZONTAL POSITION (STICK)...teaches the learner to use safe shop work practices while creating welds in the horizontal position; make horizontal padding plate welds on 1/2" mild steel with E7018 electrode; 1/4", 3/8" and 3/4" fillet welds in the horizontal position. 1/4" fillet welds on round and square tubing; perform Groove welds in the horizontal position. COREQUISITE: 31442310 SMAW-Flat Position (Stick)

SMAW-OVERHEAD POSITION (STICK)...teaches the learner to use safe shop work practices while creating welds in the overhead position. Learners will create fillet welds and groove welds in the overhead position. Learners will be introduced to pipe welding while using the SMAW welding process. COREQUISITE: 31442314 SMAW-Vert Position (Stick)

SMAW-VERTICAL POSITION (STICK)...teaches the learner to use safe shop work practices while creating welds in the vertical position; Students will experience the art of welding in the vertical position. To understand the vertical position, students will perform padding plates and fillet welds in the vertical position; Groove welds in the vertical position. Groove welds will be with and without backing. COREQUISITE: 31442312 SMAW-Vertical Position (Stick)

WELD EXAMINATION...is a study of the basic principles of weld quality. Emphasis will be on identifying and testing ferrous and non-ferrous materials. Learners will be introduced to hardening of ferrous material using the Oxyfuel process. The learner will be introduced to the inspection process of welds through NDT (non-destructive testing) and DT (destructive testing).

WELD PRINT 1 PRINT FUNDAMENTALS...prepares the learner to interpret manufacturing drawing by applying orthographic projection principles, by recognizing types of lines used in print reading, and how manufacturing prints are dimensioned. Develop print reading strategies by locating the bill of materials, title blocks, and revision blocks. Learners will be introduced to the AWS welding symbols and how they relate to manufacturing drawing.

WELD PRINT 2 WELD/WELDING SYMBOLS...prepares the learner to indicate key elements of a welding drawing, identify common joint types and edge preparations, correlate welds with basic joint types, distinguish between the different types of welds and their respective symbols, identify the location of a weld with respect to the joint using the elements included on a print and explain the rules governing the use of the arrow, reference line, supplementary symbols, and combined welding symbols. COREQUISITE: 31442385 Weld Print 1 Print Fundamentals

WELDING ADVANCE PROCESS 1...learner will demonstrate safe shop working practices while welding out of position. Learner will perform V-groove welds in the 3G and 4G position using the SMAW, FCAW and GTAW welding processes. Will perform CAC cutting and introduced to dye penetrant testing. Will create intermittent fillet welds in the horizontal position using the GMAW welding processes. COREQS: 31442326 Flux Core Arc-Vertical/Overhead Pos, 31442316 SMAW-Overhead Pos (Stick), and 31442336 GTAW Stainless/Alum Out of Position

WELDING ADVANCE PROCESS 2...the learner will demonstrate safe shop working practices while welding out of position. The learner will perform V-groove welds in the 3G and 4G position using the SMAW, FCAW and GTAW welding processes. By creating these Grooves, the student will have an opportunity to become a certified welder with the AWS. Students will create staggered intermittent fillet welds in the 2F position using the SMAW welding processes. COREQUISITE: 31442340 Welding Advance Process 1

WELDING FABRICATION INTRODUCTION...introduces the learner to various methods of steel fabrication. The learner will produce steel fabrications from assembly drawings which would include the learner's ability to read and interpret simple drawings, create sketches using appropriate welding symbols, follow written procedures, and process materials parts to proper size to fit steel fabrications. Learners will be introduced to metal finishing techniques needed to complete steel fabrications. COREQUISITES: 31442385 Weld Print 1 Print Fundamentals and 31442342 Welding Advance Process 2 or 31442342S3 Welding Advance Process 1B (Stick) or 31442342M3 Welding Advance Process 1B (Mig) or 31442342T3 Welding Advance Process 1B (Heli-Arc/Tig)

WELDING SUBMERGED ARC (SAW)...is a common arc welding process. It requires a continuously fed consumable electrode. The molten weld and the arc zone are protected from atmospheric contamination by being "submerged" under a blanket of granular fusible flux. The learner will interpret SAW terminology, setup and shut down of SAW equipment, SAW weld safety; and perform SAW welds in the flat position. COREQ: 31442326 Flux Core Arc-Vent/Overhead and PREREQ: 31442300 Welding Intro or COREQS: 10442100 Safety and Welding Fundamentals or 31442346 Industrial Maint Welding Intro or 31442345 Auto Servicing Welding

WORKPLACE EMPLOYABILITY AND READINESS...introduces students in manufacturing and trade programs to essential workplace communication and professional skills. Students will develop effective verbal and written communication techniques and enhance teamwork and problem-solving abilities. Workplace professionalism and time management skills are taught. Students will prepare to communicate effectively, work collaboratively, and demonstrate professional behaviors. Required in-person Instructor Connection time ensures personalized guidance.