

**Program Number 32-457-1
Technical Diploma • Two Terms**
ABOUT THE PROGRAM

Develop the skills you need to pursue a great career in metal fabrication and welding. In this program, the learner will 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. Learners will perfect their welding technique on mild steel, stainless steel and aluminum with a thickness range of 16 gauge up to one inch thick. Learners will perfect their weld quality techniques by using visual inspection and destructive testing. Throughout this program, the learner will apply math and print reading to today's industry standards. In this technical diploma, learners will set up, program, and use metal cutting and forming equipment to produce steel fabrication to industry specifications. Learners will be introduced to Lean manufacturing by applying their welding and fabrication skills in an automated fabrication cell to include robotic welding.

PROGRAM OUTCOMES

- 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.

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:
 - Application Check-in
 - College Orientation Overview
 - 1st Time Program Registration

**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-fabrication-technician>.

APPROXIMATE COSTS

\$152.85 per credit tuition (WI resident) plus \$9.17 per credit student activity fee. Material fee varies depending on course. Other fees vary by program. Visit lakeshore.edu/Financial-Aid/tuition-and-fees for details.

FINANCIAL AID

This program is eligible for financial aid. Visit lakeshore.edu/Financial-Aid for more information.

SPECIAL NOTE

- Learn when you want. Progress at your own pace. Receive personalized coaching and support. The full CBE definition may be found at lakeshore.edu/cbe.
- 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. The College does not guarantee its curriculum matches the requirements for preparation, examinations, or licensure for 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
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
31801361	Interpersonal Skills*	1
31801360	Workplace Fundamentals*	1
		27
Term 2		
31442301	Pipe Welding 1-Flat/Horizontal Positions*	1
31442303	Pipe Welding 2-5F/5G Positions*	1
31442305	Pipe Welding 3-6F/6G Positions*	1
31442325	Advanced Pipe Welding Processes*	1
31442307	Advanced Precision Measurement and Layout*	1
31420338	Drills and Saws*	1
31420350	Manual Mill Operation*	1
31420340	Manual Lathe Operation*	1
31442309	Weld Print 3 for Fabricators*	1
31442337	Weld Inspection and Processes*	1
31442339	Metal Finishing*	1
31420326	Manufacturing Applied Math*	1
10606151	Mechanical Drafting 1*	2
31457331	Fabrication 1-Manual Equipment*	2
31457333	Fabrication 2-CNC Press Brake and Laser	2
31457343	Fabrication 3-CNC Set up and Programming	2
31457335	Fabrication Design and Application	2
10620167	Robotics-Teach Pendant/Controls*	1
10620179	Robotics-Editing Programs*	1
31442327	Robotic Welding 1*	1
31442329	Robotic Welding 2*	1
10449114	Safety in the Workplace*	1
		27
		TOTAL 54

*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 2025-2026 rates and are subject to change prior to the start of the academic year.

Please see Industrial Welding for Term 1 course descriptions.

ADVANCED PIPE WELDING PROCESSES...instructs the learner to weld a piping spool project. They will layout, cut, grind, bevel, fit and pressure test. The spool project will be welded using the GTAW, SMAW, GMAW and the FCAW processes. The learner will have the opportunity to test for the state certification in the 6G pipe position. The learner will choose either the SMAW or the GMAW/FCAW welding processes. All welding will be completed using welding practices and will be in accordance with the AWS and ANSI steel code. COREQUISITE: 31442305 Pipe Welding 3-6F/6G Positions

ADVANCED PRECISION MEASUREMENT AND LAYOUT...provides the learner with the skills to: Use precision hand held measuring tools and the use of semi-precision measuring tools, and use of layout and measurement tools to fabricate steel projects. PREREQUISITE: 31442351 Precision Measurement and Layout

DRILLS AND SAWS...prepares the learner to interpret the attributes of hole-producing tools, follow drilling machine safety rules, identify components, operate sensitive drilling machine, identify metal composition and classification, follow cutoff safety rules, operate horizontal and vertical cutoff machines.

FABRICATION 1-MANUAL EQUIPMENT...teaches the basics of metal fabrication safety, production, measuring, hand tools, and layout. Learn how to use shears, forming, press brakes, box and pan brakes, and slip rollers. Learners will demonstrate proficiency in metal fabrication through related projects. COREQUISITES: 31442307 Adv Precision Measurement and Layout and 31442309 Weld Print 3 for Fabricators

FABRICATION 2-CNC PRESS BRAKE AND LASER...teaches the advanced process of forming product using automated and manual equipment. Demonstrate proficiency of forming by choice of tooling, calculations and sequence of forming. COREQUISITES: 10606151 Mechanical Drafting 1 and 31457331 Fabrication 1-Manual Equipment or PREREQUISITE: 31442331 Fabrication 1

FABRICATION 3-CNC SET UP AND PROGRAMMING...teaches the advanced processes of material processing using automated and manual equipment. Demonstrate proficiency of CNC programming for automated Laser cutting processes. Demonstrate proficiency in laser cutting by proper set-up and shutdown, cutting conditions, program processing and gas selection based on material. COREQUISITE: 31457333 Fabrication 2-CNC Press Brake and Laser

FABRICATION DESIGN AND APPLICATION...will have learners set-up, program, operate, weld, assemble, inspect, and finish/coat to complete metal fabrication projects and provide shop routings to demonstrate comprehension of process control in a manufacturing facility. Maintain safety in the shop for all operations with hand tools and machinery. COREQUISITE: 31457343 Fabrication 3-CNC Set up and Programming

MANUAL LATHE OPERATION...prepares the learner to perform lathe facing, turning, hole producing and threading operations safely.

MANUAL MILL OPERATION...prepares the learner to perform squaring, slot milling and hole producing using a vertical mill machine safely.

MANUFACTURING APPLIED MATH...prepares the learner with the necessary skills to use scientific calculators for the application of algebra, geometry, and trigonometry. COREQUISITE: 31420325 Manufacturing Math

MECHANICAL DRAFTING 1...provides the learner with the skills to utilize AutoCAD's drawing editor, viewing commands; apply coordinate entry methods, AutoCAD file commands; utilize draw commands, modify commands; create and edit text, prints & plots; apply geometric construction to solve a drawing problem; utilize selection sets, duplicating modify commands, layers & objects properties, blocks; apply principles of orthographic and multi view projection.

METAL FINISHING...provides learning so that the student will develop and demonstrate skills needed to properly finish weldments. Surface finish is an important element in any specification of steel or alloys regardless of the intended use. Students will demonstrate proficiency in grinding and finishing procedures within given tolerances for surface finish and flatness.

PIPE WELDING 1-FLAT/HORIZONTAL POSITIONS...will have learners producing quality pipe welds in the flat and horizontal positions. Pipe to Pipe and Socket welds will be made by using Gas Metal Arc Welding, Shielded Metal Arc Welding and the Gas Tungsten Arc Welding processes. Learners will use WPS's (welding procedure specifications sheet) of pipe welding for mild steel in accordance with various welding codes. COREQUISITES: 31442326 Flux Core Arc-Vertical/Overhead Position, 31442316 SMAW-Overhead Position (Stick), and 31442336 GTAW Stainless/Aluminum Out of Position

PIPE WELDING 2-5F/5G POSITIONS...will have learners weld pipe to pipe and socket welds in the 4F, 5F, and 5G positions. Pipe to Pipe and Socket welds will be made by using the Flux Core Arc Welding, Shield Metal Arc Welding and the Gas Tungsten Arc Welding processes. Learners will use WPS's (welding procedure specifications sheet) of pipe welding for mild steel in accordance with various welding codes. COREQUISITE: 31442301 Pipe Welding 1-Flat Horizontal Positions

PIPE WELDING 3-6F/6G POSITIONS...will teach learners to weld pipe to pipe and socket welds in the 6F and 6G positions. Pipe to Pipe and Socket welds will be made by using the Flux Core Arc Welding, Shield Metal Arc Welding and the Gas Tungsten Arc Welding processes. Learners will use WPS's (welding procedure specifications sheet) of pipe welding for mild steel in accordance with various welding codes. COREQUISITE: 31442303 Pipe Welding 2- 5F/5G Positions

ROBOTIC WELDING 1...prepares the learner to perform basic robotic welding skills on the five major joints used in industry, how to load weld programs for their welding joints, and demonstrate safety practices associated with robotic welding. PREREQUISITE: 31620335 Introduction to Robotics 2 or COREQUISITE: 10620167 Robotics-Teach Pendant/Controls

ROBOTIC WELDING 2...builds upon learner's knowledge and skill of the world of robotic welding. In this course, students will learn how to weld around pipe that is 2" in diameter and larger, V-grooves and creating fixtures for different welding joints that will be used during this credit. COREQUISITES: 31442327 Robotic Welding 1 and 10620179 Robotics-Editing Programs

ROBOTICS-EDITING PROGRAMS...teaches troubleshooting and repairing issues in a robot program. COREQUISITE: 10620167 Robotics-Teach Pendant/Controls

ROBOTICS-TEACH PENDANT/CONTROL...instructs students on using a teach pendant to control a robot. COREQUISITE: 10620179 Robotics-Editing Programs

SAFETY IN THE WORKPLACE...applies the skills and tools necessary to provide a safe and secure work environment. Each learner will demonstrate the application of safety awareness, federal/state/local compliance, incident investigation and documentation, human relations techniques, safety orientation, inspections, and risk analysis, issues of workplace violence, substance abuse, and health hazards, first aid and CPR, fire and electrical safety, emergency preparedness, and liaison with external agencies.

WELD INSPECTION AND PROCESSES...will teach welding metallurgy, metal properties and destructive testing. The learner will demonstrate proper evaluation of weld and base metal discontinuities. The learner will be introduced to VT and other NDE methods. COREQUISITE: 31442307 Adv Precision Measurement and Layout

WELD PRINT 3 FOR FABRICATORS...prepares the learner to recognize and use pipe welding symbols, dual dimensioning, analyze metric units and how they can impact print reading. Inspection and Testing by the use of destructive testing symbols, and non-destructive testing symbols, understanding the International Standards symbols for welding, interpret Geometric Dimensioning and Tolerancing characteristic and symbols. COREQUISITE: 31442343 Weld Print 2 Weld/Welding Symbols