

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. Students 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

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

PROGRAM ADMISSIONS STEPS

- Work with Career Coach to:
 - Submit application and \$30 fee.
 - Submit official transcripts (high school and other colleges).

ENROLLMENT PROCESS

After you are admitted to your program you will meet with your Advisor to plan your first semester schedule, review your entire plan of study, and complete any additional enrollment requirements. Enrollment requirements for this program's courses include:

- Complete Functional Abilities Statement of Understanding form.
- Meet with your program's advisor.

APPROXIMATE COSTS

- \$140 per credit (resident)
- Other fees vary by program (books, supplies, materials, tools, uniforms, health related exams, etc.) Visit gotoltc.edu/financial-aid/tuition-and-fees for details.

FINANCIAL AID

This program is eligible for financial aid. Visit gotoltc.edu/Financial-Aid or talk with your Career Coach about how to apply for aid.

CONTACT

LTC Career Coach
920.693.1162 • CareerCoach@gotoltc.edu

Catalog No.	Class Title	Credit(s)
Term 1		
31442300	Welding Introduction	1
31442308	Welding Metallurgy	1
31442350	Welding Hand Tools and Measurement	1
31442310	Welding Shielded Metal Arc 1A (Stick)	1
31442312	Welding Shielded Metal Arc 1B (Stick)	1
31442314	Welding Shielded Metal Arc 2A (Stick)	1
31442316	Welding Shielded Metal Arc 2B (Stick)	1
31442320	Welding Gas Metal Arc 1A (Wire/Mig)	1
31442322	Welding Gas Metal Arc 1B (Wire/Mig)	1
31442324	Welding Gas Metal Arc 2A (Wire/Mig)	1
31442326	Welding Gas Metal Arc 2B (Wire/Mig)	1
31442304	Welding Submerged Arc (SAW)	1
31442330	Welding Gas Tungsten Arc 1A (Heli-Arc/TIG)	1
31442332	Welding Gas Tungsten Arc 1B (Heli-Arc/TIG)	1
31442334	Welding Gas Tungsten Arc 2A (Heli-Arc/TIG)	1
31442336	Welding Gas Tungsten Arc 2B (Heli-Arc/TIG)	1
31442318	Pipe Welding Fundamentals	1
31442382	Welding Math 1	1
31442385	Welding Print Reading	1
31442340	Welding Advance Process 1A	1
31442342	Welding Advance Process 1B	1
31442357	Welding Fabrication Introduction	2
10106116	Computer Essentials	1
31801359	Communication Skills for the Workplace	2
31809362	Psychology for Life	1
		27
Term 2		
31442301	Advanced Pipe Welding 1	1
31442303	Advanced Pipe Welding 2	1
31442305	Advanced Pipe Welding 3	1
31442325	Advanced Pipe Welding Processes	1
31442307	Measurement for Fabricators	1
31420337	Drills for Fabricators	1
31420348	Machine Tool 1 Mills for Fabricators	1
31420349	Machine Tool Lathes 1 for Fabricators	1
31442309	Print Reading for Fabricators	1
31442311	Weld Quality 1	1
31442313	Weld Quality 2	1
31442315	Weld Quality 3	1
31442317	Weld Quality 4	1
31442323	CNC Programming for Fabricators	1
31620333	Introduction to Robotics 1A	1
31620335	Introduction to Robotics 1B	1
31442327	Robotics Welding 1A	1
31442329	Robotics Welding 1B	1
31442331	Fabrication 1A	2
31442333	Fabrication 1B	2
31442335	Fabrication Design and Application	2
31449301	OSHA 30	1
31442384	Weld Math 2	1
10606101	Basic Mechanical Drafting	2
		28
		TOTAL 55

Curriculum and Program Acceptance requirements are subject to change. Program start dates vary; check with your advisor for details.



Please see *Industrial Welding for Term 1* course descriptions.

ADVANCED PIPE WELDING 1...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 Wldg Gas Metal Arc 2B, 31442316 Wldg Shielded Metal Arc 2B, and 31442336 Wldg Gas Tungsten Arc 2B

ADVANCED PIPE WELDING 2...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 Advanced Pipe Welding 1

ADVANCED PIPE WELDING 3...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 Advanced Pipe Welding 2

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 Adv Pipe Welding 3

BASIC MECHANICAL DRAFTING USING AUTOCAD...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.

CNC PROGRAMMING FOR FABRICATORS...prepares the learner to interpret positions in the coordinate systems, prepare a sequence of machining operations, use G/M programming codes, and prepare G/M part programs for machining and cutting operations.

DRILLS FOR FABRICATORS...prepares the learner to calculate drill speeds and feed rates to match specific material types, identify attributes of hole-producing cutting tools, follow drilling machine tool safety rules, identify drilling machine tool components, and operate sensitive drilling equipment.

FABRICATION 1A...will teach the advanced process of forming product using automated and manual equipment. Demonstrate proficiency of forming by choice of tooling, calculations and sequence of forming. COREQUISITE: 31442307 Measurement for Fabricators and 31442309 Print Reading for Fabricators

FABRICATION 1B...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. COREQUISITE: 31442331 Fabrication 1A

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 while providing written documentation for machine safety to prove comprehension. COREQUISITE: 31442333 Fabrication 1B

INTRODUCTION TO ROBOTICS 1A...prepares the learner to identify the component parts of a robot; describe teach pendant and robot functions; power up the robot control in proper sequence; jog in Joint and Cartesian movement; establish robot axis soft limits; identify axis movements; navigate the teach pendant to set up the robot for desired movement; demonstrate working knowledge of arm speed and inching control.

INTRODUCTION TO ROBOTICS 1B...prepares the learner to define the Frames of reference used by the coordinate system; create multiple Tool Frames; create a program file; write a functional motion instruction; edit an existing program; demonstrate the use of a wait statement; demonstrate the use of a Call statement; demonstrate the use of an Output statement; and upload and download program memory files. COREQUISITE: 31620335 Introduction to Robotics 1A

MACHINE TOOL LATHES 1 FOR FABRICATORS...prepares the learner to follow engine lathe safety rules, identify engine lathe components, and operate engine lathe machine tools, perform facing and center drilling operations, perform turning operations, and perform hole-producing operations.

MACHINE TOOL MILLS 1 FOR FABRICATORS...provides the learner with the skills to: Apply safety rules, identify machine components, select cutting tools, set up the milling machine for work, mill square surfaces, mill precision steps and slots, and perform hole producing operations.

MEASUREMENT FOR FABRICATORS...provides the learner with the skills to: Use precision hand held measuring tools and the use semi-precision measuring tools, use of layout and measurement tools to fabricate steel projects.

OSHA 30...gives a basic overview of OSHA's role in prevention and elimination of work-related illnesses and injuries. It includes information about employer and employee rights and responsibilities, and a brief look at safety on the job site in relation to cranes, electrical, excavation, fall protection, materials handling, personal protection equipment, stairs-ladders-scaffolds, and power tools.

PRINT READING 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.

ROBOTIC WELDING 1A...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. COREQUISITE: 31620335 Introduction to Robotics 1B

ROBOTIC WELDING 1B...builds upon learner's knowledge and skills of the robotic world, to weld the horizontal and circumferential positions, perform basic troubleshooting skills in the program and in the work cell, learn how to edit the weld program and re-teach the robot, and maintain good weld quality throughout the welding process. COREQUISITE: 31442327 Robotic Welding 1A

WELDING MATH 2...prepares the learner with the necessary skills to use scientific calculators for the application of solving problems of ratio and proportion, precision, and accuracy in measurements, unit conversions, direct-length measurements, pre-algebra, and simple and complex equations using algebra concepts. The class is designed for individualized student needs. This is credit two of the two-credits needed for the Welding program. COREQUISITE: 31442382 Weld Math 1 or CONDITION: Welding Math 1 and2 Testout or equivalent

WELD QUALITY 1...prepares the learner with information on nondestructive examination methods applicable to common welding processes. It will assist welding inspectors and welding educators with knowledge of welding and inspection fundamentals useful on the jobsite. It will prepare exam candidates for Part A (Fundamentals) of the AWS-CWI exam. Students will be exposed to safe practices, metric practices, and metal joining and cutting processes, terminology weld joint geometry, welding and inspection symbols.

WELD QUALITY 2...will teach the learner the application of documents governing welding inspection and qualification. Welding metallurgy, metal properties and destructive testing will be taught. The learner will demonstrate proper evaluation of weld and base metal discontinuities. The learner will be introduced to VT and other NDE methods. COREQUISITE: 31442311 Weld Quality 1A

WELD QUALITY 3...provides hands-on training in the use of weld measurement tools and weld replicas to determine the sizes of various weld discontinuities and compare their findings to the codebook to determine the acceptability or rejection criteria; sample practical examination to prepare test candidates for Part B (Practical Applications) of the AWS-CWI exam; use inspection tools, ensure compliance with the code, proper documentation, and why visual inspection can be the most effective NDE techniques. COREQUISITE: 31442313 Weld Quality 1B

WELD QUALITY 4...prepares the learner for proper navigation of the AWS D1.1 code, including qualification of welding procedures for welds containing filler-metal additions, design and preparation of the joint for production welding, nondestructive testing and acceptance standards, and automatic welding with and without filler-metal additions, attendees will practice open codebook testing under time constraints. COREQUISITE: 31442315 Weld Quality 2A