LTC LAKESHORE TECHNICAL COLLEGE

WELDING • INDUSTRIAL

Program Number 31-442-1
Technical Diploma • One Term

ABOUT THE PROGRAM

Evidence of welders' work is all around us—everything from battleships, cars, and piping to the amazing dome on the U.S. Capitol Building. If you like hands-on work, have solid math and reading skills, are dedicated to accuracy, and have an eye for detail, welding is the perfect career for you.

PROGRAM OUTCOMES

- Apply safety practices while using welding machines and metal working machines that are used in today's industry.
- Recognize the safety hazards that are in a weld shop setting (grinders, hand tools, etc.).
- Interpret blueprints and AWS welding symbols.
- Apply basic math, algebra, and geometry concepts to the field of welding.
- Apply welding terminology used in industry.
- Troubleshoot problems with welding equipment.
- Analyze weld quality in mild steel, stainless steel, and aluminum using various weld inspection techniques.
- Perform welding in all positions using SMAW, GMAW, GTAW, and FCAW welding process.
- Perform procedures using submerged arc welding process.
- Perform procedures using oxyfuel, plasma arc cutting, and carbon arc cutting processes.
- Recognize ferrous and nonferrous materials and how they are affected by heat.

ADMISSIONS STEPS

- Work with Admissions Specialist to:
  - Submit application and $30 fee.
  - Complete an assessment for placement (Accuplacer or ACT).
  - Submit official transcripts (high school and other colleges).
- Meet with program advisor/counselor to discuss program details.

APPROXIMATE COSTS

- $132 per credit (resident)
- $198 per credit (out-of-state 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.

PLACEMENT SCORES

Accuplacer/ACT scores will be used to develop your educational plan. Contact your program advisor/counselor for details.

SPECIAL NOTE

This program is available in a part-time evening and full-time day offering. All classes meet the American Welding Society requirements.

CAREER & EDUCATION ADVANCEMENT OPPORTUNITIES

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

CONTACT

Chou Yang, Admissions Specialist
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Catalog No.	Class Title	Credit(s)
31442300	Welding Introduction	1
31442304	Welding Submerged Arc (SAW)	1
31442310	Welding Shielded Metal Arc IA (Stick)	1
31442312	Welding Shielded Metal Arc IB (Stick)	1
31442314	Welding Shielded Metal Arc IIA (Stick)	1
31442316	Welding Shielded Metal Arc IIB (Stick)	1
31442320	Welding Gas Metal Arc IA (Wire/Mig)	1
31442322	Welding Gas Metal Arc IB (Wire/Mig)	1
31442324	Welding Gas Metal Arc IIA (Wire/Mig)	1
31442326	Welding Gas Metal Arc IIB (Wire/Mig)	1
31442382	Welding Math 1	1
31442385	Welding Print Reading	1
31809362	Psychology for Life	1
31442308	Welding Metallurgy	1
31442330	Welding Gas Tungsten Arc IA (Heli-Arc/TIG)	1
31442332	Welding Gas Tungsten Arc IB (Heli-Arc/TIG)	1
31442334	Welding Gas Tungsten Arc IIA (Heli-Arc/TIG)	1
31442336	Welding Gas Tungsten Arc IIB (Heli-Arc/TIG)	1
31442340	Welding Advance Process IA	1
31442342	Welding Advance Process IB	1
31442357	Welding Fabrication Introduction	2
31442384	Welding Math 2	1
31442350	Welding Maintenance Introduction	1
10106116	Computer Essentials	1
31801359	Comm Skills for the Workplace	2

TOTAL 27

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

The Hire in HIGHER EDUCATION

COMMUNICATION SKILLS FOR THE WORKPLACE...prepares the student to develop paper job-search tools and job-related writing skills to increase job stability; introduces the students to team-building skills to resolve organizational problems; introduces the student to the skills of effective listening; prepares the student to respond to workplace criticism and praise; and introduces the student to interpersonal relationship skills, including effective interviewing skills, customer relations, and management/employee relations.

COMPUTER ESSENTIALS...covers computer technology and basic computer skills for the student who is just starting classes at LTC. This course will include topics related to uses of computer hardware and software, internet searching, e-mail, MyLTC, online courses, and an introduction to documents and presentations.

PSYCHOLOGY FOR LIFE...prepares the learner to select behavior modification techniques, demonstrate techniques for enhancing memory, analyze expressions of emotion, use conflict for common good, employ techniques to reduce conflict/frustration, use several methods to reduce stress, interpret personality types, ascertain contributors to perception, and apply methods of problem-solving.

WELDING ADVANCE PROCESS 1A...is the third course in a student selected welding process. In it the student will begin to use that process to weld specialty metals including pipe. PREREQUISITE: 30442308M2 GMAWII; 30442308S2 SMAWII; 30442308T2 GTAW 2; COREQUISITES: 31442326 Wire/MIG; 30442326 Wire/MIG; 31442316 Stick; 30442316 Stick; 31442336 Heli-Arc/TIG; 30442336 Heli-Arc/TIG); CONDITION: 314421 or 304422 Wldg prog reqmnts met

WELDING ADVANCE PROCESS 1B...is the third course in a student selected welding process. In it the student will learn to use that process to weld specialty metals including pipe in preparation for welder qualification testing. PREREQUISITE: 30442308S3 SMAWIII; 30442308T2 GTAW2 COREQUISITE: 31442340MC Wire/MIG; 30442340M3 Wire/MIG; 31442340S3 Stick; 30442340S3 Stick; 314442336 Heli-Arc/TIG; 30442336 Heli-Arc/TIG; CONDITION: 314421 or 304422 Wldg prog req met

WELDING FABRICATION INTRODUCTION...introduces the learner to various types of structural steel, sheet metal, and pipe and prepares the learner to perfom fabrication from assembly prints, including cutting, welding, bending, straightening and repair. Repair practice of home and shop projects is encouraged for skill development. COREQUISITE: 31442340 Welding Advance Process IA or 31442340M3 Wldg Adv Process IA or 31442340S3 Wldg Adv Process IA or 31442340T3 Welding Advance Process IA and 31457384 Welding Print Reading or 31442385 Welding Print Reading

WELDING GAS METAL ARC 1A...prepares the learner to demonstrate safe shop work practices; set up and shut down of GMAW (Gas Metal Arc Welding) and FCAW (Flux Core Arc Welding) equipment; welding 11ga mild steel in the flat, horizontal, vertical down, and overhead positions; weld 1/4" mild steel in the flat, horizontal and overhead positions; welding 3/8" mild steel in the vertical up position; and welding 1/2" mild steel in the flat and horizontal positions using the FCAW process. COREQUISITE: 31442300 Welding Intro or 30442300 Welding Intro or 31462301 Ind Mtnc Welding or 31404314 Welding Auto Svcg PREREQUISITE: 30442300IN Welding Intro or successful completion of Welding Intro Hands-on exam

WELDING GAS METAL ARC 1B...prepares the learner to demonstrate safe shop work practices; weld tube to plate making 1/4" fillet welds; make fillet welds in the horizontal, vertical, and overhead positions using .052" flux core electrode wire on mild steel; make goove welds in the horizontal, vertical, and overhead positions using 1/2 inch steel plate. Using .052" flux core electrode wire; weld mild steel plate in the flat and horizontal positions using .052 metal core wire. COREQUISITE: 31442320 Welding Gas Metal Arc IA (Wire/MIG) or 30442320 Welding Gas Metal Arc IA (Wire/MIG) PREREQUISITE: 30442300GM GMAWI

WELDING GAS METAL ARC 2A...prepares the learner to demonstrate safe shop work practices; make single bevel groove welds in the flat position; make groove welds in the horizontal, vertical, and overhead positions using 1 inch steel plate. Using .052" flux core electrode wire; make single bevel groove welds in the flat position using .052" metal core wire. COREQUISITE: 31442322 Welding Gas Metal Arc IB (Wire/MIG) or 30442322 Welding Gas Metal Arc IB (Wire/MIG) PREREQUISITE: 30442300GM GMAWI or 30442300M2 GMAWI

WELDING GAS METAL ARC 2B...prepares the learner to demonstrate safe shop work practices; make single bevel groove welds in the horizontal, vertical, and overhead positions using 1 inch steel plate, and using .052" flux core electrode wire; make single bevel tee welds in the horizontal position using .052" metal core wire. Learners will be introduced to welding through corners and stager starts and stops. COREQUISITE: 31442324 Welding Gas Metal Arc IIA (Wire/MIG) or 30442324 Welding Gas Metal Arc IIA (Wire/MIG) PREREQUISITE: 30442308M2 GMAWII or 30442308M1 GMAWII

WELDING GAS TUNGSTEN ARC 1A...prepares the learner to demonstrate safe shop work practices; weld mild steel in the flat position and horizontal positions, weld stainless steel in the flat position and horizontal positions, and weld aluminum in the flat position and horizontal positions using the GTAW process. COREQUISITE: 31442300 Welding Intro or 30442300 Welding Intro or 31462301 Ind Mtnc Welding or 31404314 Welding Auto Svcg PREREQUISITE: 30442300IN Welding Intro or successful completion of Welding Intro Hands-on exam

WELDING GAS TUNGSTEN ARC 1B...prepares the learner to demonstrate safe shop work practices, weld mild steel in the horizontal and vertical up positions, weld stainless steel in the horizontal and vertical up positions, weld aluminum in the horizontal and vertical up positions using the GTAW process, and weld mild steel using the GTAW pulse process. COREQUISITE: 31442330 Welding Gas Tungsten Arc IA (Heli-Arc/TIG) or 30442330 Welding Gas Tungsten Arc IA (Heli-Arc/TIG) PREREQUISITE: 30442300GT GTAWI

WELDING GAS TUNGSTEN ARC 2A...prepares the learner to demonstrate safe shop work practices; weld a square butt joint on mild steel in the flat, horizontal, and overhead positions using the GTAWP process; weld a lap joint on mild steel in the horizontal, vertical, and overhead positions using the GTAWP process; weld a tee joint on mild steel in the horizontal, vertical, and overhead positions using the GTAWP process; and minimize oxidation in metals during welding. COREQUISITE: 31442332 Welding Gas Tungsten Arc IB (Heli-Arc/TIG) or 30442332 Welding Gas Tungsten Arc IB (Heli-Arc/TIG) PREREQUISITE: 30442300GT GTAWI or 30442300T2 GTAWI

WELDING GAS TUNGSTEN ARC 2B...prepares the learner to demonstrate safe shop work practices; weld 1/4" mild steel plate in the flat, horizontal, vertical, and overhead positions using the GTAW process; weld multi-pass fillets in 1/4" mild steel plate in the flat position using the GTAW "walking the cup" process; and make corner weldments in mild steel using the GTAW process. COREQUISITE: 31442334 Welding Gas Tungsten Arc IIA (Heli-Arc/TIG) or 30442334 Welding Gas Tungsten Arc IIA (Heli-Arc/TIG) PREREQUISITE: 30442308T2 GTAW2 or 30442308T1 GTAW2

WELDING INTRO...is an introduction to the welding field. The necessary safety, set up of welding equipment and fabrication machinery that is used in the industry are presented. The learner will practice welding skills using the SMAW, GMAW, and GTAW equipment and cutting operations are covered. Common joints and positions are practiced in all types of welding processes.

WELDING MAINTENANCE INTRODUCTION...prepares the learner to communicate using the proper terminology used in industry, demonstrate safety practices in the work place, demonstrate the use of hand tools and the use of power tools, perform measurements of steel using measuring tools, classify and install threaded mechanical fasteners, safely perform rigging operations, and properly perform lockout/tagout procedures for equipment inspection and repair.

WELDING MATH 1...provides the learner with the necessary skills to solve problems involving whole numbers, fractions, and decimal numbers using pad and pencil and calculator. The course is designed for individualized student needs. This is credit one of the two math credits need for the Welding program.

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.

WELDING METALLURGY.....prepares the learner to interpret properties of ferrous materials, heat treat ferrous metals; and test the hardness of ferrous materials. The learner will interpret weld discontinuities and how heat of the weld affects base metal properties.

WELDING PRINT READING...prepares the learner to apply orthographic projection principles and AWS welding symbols as they relate to welding fabrications. Students will learn the basics of print reading including alphabet lines, tolerances, bill of materials, title blocks, and revision blocks.

WELDING SHIELDED METAL ARC IA...prepares the learner to demonstrate safe shop work practices; make beads and surfacing welds on mild steel; making 1/4 and 3/4 fillet welds on 3/8" mild steel plate in the horizontal, vertical and overhead positions; and perform a groove weld in the flat position on mild steel plate. Weld joints will be performed with using E6011 and E7018 stick electrodes. COREQUISITE: 31442300 Welding Intro or 30442300 Welding Intro or 30442300IN Welding Intro or 31462301 Ind Mtnc Welding or 31404314 Welding Auto Svcg or successful completion of Welding Intro Hands-on exam

WELDING SHIELDED METAL ARC IB...prepares the learner to demonstrate safe shop work practices; make surfacing welds in the horizontal position; weld tube to plate making 1/4" fillet welds; and make groove welds in horizontal positions. Learners will be introduced to open root groove joint in the flat position. Weld joints will be performed with E7018 electrode. COREQUISITE: 31442310 Welding Shielded Metal Arc IA (Stick) or 30442310 Welding Shielded Meteal Arc IA (Stick) PREREQUISITE: 30442300SM SMAWI

WELDING SHIELDED METAL ARC IIA...prepares the learner to use safe shop work practices; learners will experience the art of welding in the vertical and overhead position. To gain an understanding of the vertical and overhead positions, learners will perform padding plate welds on mild steel with E7018 electrode; perform fillet welds in the vertical, overhead and 5F positions; and groove welds will also be performed in the vertical and overhead position. Groove welds will be with and without backing. COREQUISITE: 31442312 Welding Shielded Metal Arc IB (Stick) or 30442312 Welding Shielded Metal Arc IB (Stick) PREREQUISITE: 30442300SM SMAWI or 30442300S2 SMAWI

WELDING SHIELDED METAL ARC IIB...prepares the learner to demonstrate safe shop work practices while making multi pass groove welds in single beveled plate in the 1G, 3G, and 4G positions using E7018 electrode. You will make multi pass fillet welds to pipe to plate in the 2F and 5F positions. You will be introduced to pipe welding in the 1G and 2G positions. COREQUISITE: 31442314 Welding Shielded Metal Arc IIA (Stick) or 30442314 Welding Shielded Metal Arc IIA (Stick) PREREQUISITE: 30442308S2 SMAWII or 30442308S1 SMAWII

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. PREREQUISITE: 30442300IN Welding Intro or COREQUISITES: 31442300 Welding Intro or 30442300 Welding Intro or 31462301 Ind Mtnc Welding or 31404314 Welding Auto Svcg or Welding Intro Hands-on Exam