

# Welding Technology (WELD)

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## Courses

### WELD A101 Gas and Arc Welding 3 Credits

Introduces basic principles of welding and thermal cutting. Covers oxyacetylene welding (OAW), brazing, and silver soldering. This course is divided between OAW, gas metal arc welding (GMAW), and shielded metal arc welding (SMAW) processes.

### WELD A102 Gas Welding 2 Credits

Develops basic oxy-acetylene welding, brazing, and cast iron welding skills, emphasizing hands-on class assignments.

**May Be Stacked With:** WELD A103 and WELD A104

### WELD A103 Arc Welding 4 Credits

Provides training and hands-on experience required for structural steel plate welding certification. Students certify on 0.375 inch plate, open root or with backing, at ASME or AWS code standards.

**May Be Stacked With:** WELD A102 and WELD A104

### WELD A104 Arc Welding: Low-Hydrogen Electrodes 4 Credits

Develops skills and techniques required for low-hydrogen electrode welder certification, emphasizing hands-on experience. Students certify on 0.375 inch plate with backing, to AWS code standards.

**Registration Restrictions:** Arc welding experience can substitute for prerequisites.

**May Be Stacked With:** WELD A102 and WELD A103

**Prerequisites:** WELD A101 or WELD A103.

### WELD A105 Pipe Welding 4 Credits

Develops skills and techniques for pipe welding, all positions, open root, uphill and downhill using ANSI Schedule 40 steel pipe sizes of 4-6 inch.

**Registration Restrictions:** Current certification of plate, open root, vertically upward, or pre-test during registration.

**May Be Stacked With:** WELD A106

**Prerequisites:** WELD A103 and WELD A104.

### WELD A106 Pipe Certification 4 Credits

Develops skills required for pipe welding, all positions, open root, uphill and downhill using 6 inch Schedule 80 steel pipe, and certify on 6 inch Schedule 80 uphill procedure, ANSI B31 3 code standard.

**May Be Stacked With:** WELD A105

**Prerequisites:** WELD A105.

### WELD A108 Wire Welding 4 Credits

Develops skills and techniques in wire-feed (MIG) welding on mild steel, stainless steel and aluminum, with and without gas shielding. Students gain hands-on experience with all wire types on the current market.

### WELD A109 TIG Welding 4 Credits

Develops skills and techniques for tungsten-inert gas (TIG) welding on aluminum, zinc alloys, copper, magnesium, mild steel and stainless steel. Emphasizes hands-on welding assignments.

**Prerequisites:** WELD A101 or WELD A102.

### WELD A112 Shielded Metal Arc Welding (SMAW) 3 Credits

Introduces the welding of mild steels with covered electrodes. Includes welding safety, electric arc welding equipment, electrode identification and selection, basic joint design, and welding practices on carbon steel plate.

### WELD A114 Welding of High Strength Steels 3 Credits

Builds on knowledge and techniques covered in WELD A112. Introduces the welding of high strength steels with covered electrodes. Includes welding safety, low alloy electrode selection, welding joint design, and alloy steel specifications.

**Prerequisites:** WELD A112 with a minimum grade of C.

### WELD A117 Pipe Fabrication 4 Credits

Presents theory and practice for the layout and assembly of piping offsets and pipe spool assemblies common to the oil and gas industry.

**Prerequisites:** (MATH A105 with a minimum grade of C or MATH A115 with a minimum grade of C or MATH A121 with a minimum grade of C or MATH A151 with a minimum grade of C or MATH A152 with a minimum grade of C or MATH A155 with a minimum grade of C or MATH A221 with a minimum grade of C or MATH A251 with a minimum grade of C or MATH A252 with a minimum grade of C or MATH A253 with a minimum grade of C) and WELD A112 with a minimum grade of C.

### WELD A121 Pipe Welding Vertical-Down SMAW 4 Credits

Builds on knowledge and techniques covered in WELD A112. Introduces vertical-down shielded metal arc welding (SMAW) techniques on carbon steel pipe using EXX 10 electrodes. Includes information on pipe material specifications, pipe fittings and assembly, welder qualification and American Petroleum Institute (API) Standard 1104 requirements.

**May Be Stacked With:** WELD A122

**Prerequisites:** WELD A112 with a minimum grade of C and WELD A114 with a minimum grade of C.

### WELD A122 Pipe Welding Vertical-Up SMAW 4 Credits

Builds on knowledge and techniques covered in WELD A121. Introduces vertical-up shielded metal arc welding (SMAW) on carbon and alloy steel pipe using EXX 10 and EXX18 electrodes. Includes information on high-strength alloy pipe specifications and weld/welder evaluation/qualifications defined in ASME IX and ANSI/ASME B31.3.

**Registration Restrictions:** Instructor approval

**May Be Stacked With:** WELD A121

**Prerequisites:** WELD A121 with a minimum grade of C.

**WELD A157** Technical Drawings for Welders **3 Credits**

Provides instruction on proper reading and interpretation of industrial blueprints commonly used in the construction and petroleum industries. Covers terminology, welding symbols, processes and their applications, including alphabet of lines, orthographic and isometric drawings, piping, standard and ISO measuring devices and dimensioning, scaling, structural materials, industry standards, and computer-aided drafting principles.

**Prerequisites:** MATH A055 with a minimum grade of C or MATH A105 with a minimum grade of C or MATH A115 with a minimum grade of C or MATH A121 with a minimum grade of C or MATH A151 with a minimum grade of C or MATH A152 with a minimum grade of C or MATH A155 with a minimum grade of C or MATH A221 with a minimum grade of C or MATH A251 with a minimum grade of C or MATH A252 with a minimum grade of C or MATH A253 with a minimum grade of C.

**WELD A161** Gas Metal Arc Welding (GMAW) **3 Credits**

Introduces gas metal arc welding (GMAW) techniques for joining a number of metals. Includes information on power supplies, wire feed equipment, shielding gases, filler metal selection, and electrical characteristics of the arc.

**WELD A162** Flux Cored Arc Welding (FCAW) **3 Credits**

Builds on knowledge and techniques covered in WELD A112 or WELD A161. Introduces theory and practice of FCAW using self-shielded and dual-shielded wire processes. Covers physics of metal transfer, electrical characteristics of power supplies, wire feeders, and filler metal selection and storage.

**Prerequisites:** WELD A112 with a minimum grade of C or WELD A161 with a minimum grade of C.

**WELD A174** Gas Tungsten Arc Welding (GTAW) **3 Credits**

Builds on knowledge and techniques covered in WELD A112. Introduces gas tungsten arc welding (GTAW) techniques for joining a number of metals. Includes information on power supplies, torches, inert gases, filler metal selection and electrical characteristics of the arc.

**Prerequisites:** WELD A112 with a minimum grade of C or WELD A161 with a minimum grade of C.

**WELD A190** Selected Topics in Welding Technology **1-4 Credits**

Presents relevant topics and techniques in the field of welding and fabrication.

**Special Note:** May be repeated for credit with change of subtitle.

**Prerequisites:** WELD A101.

**WELD A207** Industrial Welding Qualification **2 Credits**

Provides opportunity for experienced welding students to study, practice and demonstrate mastery of one or more specific technical welding methods leading to national industrial welding qualification. Each student will be evaluated on an individual basis derived from the student's professional objectives.

**Registration Restrictions:** Prequalification welding test.

**WELD A261** Ultrasonic Testing **4 Credits**

Covers the principles of ultrasonic testing (UT) methods with compression and shear wave techniques. Examines inspection techniques in accordance with American Welding Society (AWS) D1.1, API 1104 and American Society of Mechanical Engineers (ASME) codes. Prepares students for the American Society for Nondestructive Testing (ASNT) SNT-TC-1A code recommended Level I and Level II UT general, specific, and practical examinations.

**Prerequisites:** MATH A105 with a minimum grade of C and WELD A262 with a minimum grade of C.

**WELD A262** General Nondestructive Testing **3 Credits**

Presents nondestructive testing methods of dye penetrant, magnetic particle, and visual testing. Includes the applications, advantages, and limitations of these NDT methods. Prepares students for the American Society for Nondestructive Testing (ASNT) SNT-TC-1A code Level I and Level II examinations in liquid penetrant testing (PT) and magnetic particle testing (MT).

**Prerequisites:** MATH A105 with a minimum grade of C.

**WELD A263** Radiographic Testing Safety **2 Credits**

Presents the safety practices and USNRC regulations for industrial radiography in nondestructive examination. Prepares for both Radioactive Materials (RAM) and the X-ray category Industrial Radiography Radiation Safety Personnel (IRRSP) examination administered by the American Society for Nondestructive Testing (ASNT).

**Prerequisites:** MATH A105 with a minimum grade of C and WELD A112 with a minimum grade of C.

**WELD A264** Radiographic Testing **4 Credits**

Presents theory and application of industrial radiography and meets the American Society for Nondestructive Testing (ASNT) initial training hour requirements for Level I and Level II radiographer. Includes operation of equipment, film exposures and development, radiographic procedure specifications, interpretation of radiographs, and a brief review of radiation safety.

**Prerequisites:** MATH A105 with a minimum grade of C and WELD A112 with a minimum grade of C and WELD A263 with a minimum grade of C or concurrent enrollment.

**WELD A281** Welding Inspection and Code Review **3 Credits**

Presents various welding inspection methods and a study of applicable welding codes and standards in preparation for the American Welding Society (AWS) Certified Welding Inspector (CWI) Examination.

**Prerequisites:** MATH A105 with a minimum grade of C and WELD A112 with a minimum grade of C and WELD A157 with a minimum grade of C.

**WELD A287** Welding Metallurgy Applications **5 Credits**

Presents technical information in welding metallurgy. Includes laboratory practice in metallography, heat-treating, and mechanical properties testing of various metals.

**Prerequisites:** MATH A105 with a minimum grade of C and WELD A112 with a minimum grade of C.

**WELD A295** Welding & Nondestructive Testing Internship **1-3****Credits**

Provides experience in selected industry settings for students nearing completion of a program in the Welding & Nondestructive Testing Technology Department at UAA.

**Special Note:** Course may be repeated for a maximum of 3 credits. Students required to provide all personal protective equipment (PPE) and related workplace supplies required by the employer for the position. No more than one credit per two-week period will be awarded.

**Registration Restrictions:** A minimum of 12 credits completed of advisor-approved Welding & Nondestructive Testing Technology courses with a minimum GPA of 2.5 or higher. Enrollment is restricted to admitted majors in the Welding & Nondestructive Testing Technology program. Instructor approval required.