

Degree: A.S. - Welding Technology

Certificates: Gas Metal Arc Plate and Pipe
Gas Tungsten Arc Plate & Pipe Welding
Mathematics & Blueprint Interpretation
Shielded Metal Arc Plate and Pipe
Welding Metallurgy and Inspection

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American Welding Society
Accredited Testing Facility, 2001

Website: www.arc.losrios.edu/~welding/

The ARC Program

The American Welding Society (AWS) nationally accredits American River College's welding program. ARC has met all the requirements of the AWS QC4 Standards for Accreditation of Test Facilities for their Certified Welder Program. AWS certification is recognized by the welding industry as an important step in professional development.

Welding Technology Degree

The Welding Technology degree provides skills and knowledge in manual and semi-automatic welding processes used in the metal fabrication and construction industries. Instruction covers materials, equipment, procedures, testing techniques as well as safety and blueprint reading. Competencies include techniques of joining ferrous and non-ferrous metals by the use of Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), Flux Cored Arc Welding (FCAW), and Gas Tungsten Arc Welding (GTAW), and welding procedures.

Career Opportunities

Welding certification is recognized by the welding industry as an important step in the profession. The American Welding Society (AWS) nationally accredits American River College's welding program. The ARC welding program has met all the requirements of the AWS QC4 standards for Accreditation of Test Facilities for their Certified Welder Program.

Graduating students may find positions in oil refineries, nuclear power plants, aerospace, structural buildings, bridge construction, auto industry, and small commercial fabricating shops.

Requirements for Degree Major 37 units

WELD 102	Introduction to Welding Metallurgy	3
WELD 116	Welding Inspection	2
WELD 130	Gas Tungsten Arc Welding	3
WELD 133	Gas Metal Arc Welding, Semi-Automatic Processes	3
WELD 134	Gas Metal Arc Welding of Non-Ferrous Metals	2
WELD 135	Gas Metal Arc Welding (GMAW)-Pipe	3
WELD 140	Mathematics for Welding Technicians	3
WELD 300	Introduction to Welding	3
WELD 320	Shielded Metal Arc Welding (Stick Electrode Welding)	3
WELD 321	Shielded Metal Arc Welding (Stick Electrode Welding)	3
WELD 322	Advanced Pipe Welding in Shielded Metal Arc	3
WELD 332	Gas Tungsten Arc Welding (Pipe)	3
WELD 342	Symbol Reading, Layout and Fabrication	3

Associate Degree Requirements: The Welding Technology Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Mathematics and Blueprint Interpretation (144 hours) Certificate

The Mathematics and Blueprint Interpretation certificate promotes competence in solving mathematical and manufacturing problems that apply to the welding trade. It emphasizes metal placement, measurement and layout of tools used in construction, and the fundamentals of blueprint reading.

Requirements for Certificate		9 Units
WELD 140	Mathematics for Welding Technicians	3
WELD 300	Introduction to Welding	3
WELD 342	Symbol Reading, Layout and Fabrication	3

Gas Metal Arc Plate and Pipe (252 hours) Certificate

The Gas Metal Arc Welding certificate promotes competence in welding with different types of metal transfer, constant voltage power sources, different types of shielding gases, and electrode selection on various joint designs. Instruction is provided in gas metal and flux cored arc welding on fillet and groove welds to specific structural and pipe standards.

Requirements for Certificate		11 Units
WELD 133	Gas Metal Arc Welding, Semi-Automatic Processes	3
WELD 134	Gas Metal Arc Welding of Non-Ferrous Metals	2
WELD 135	Gas Metal Arc Welding (GMAW)-Pipe	3
WELD 300	Introduction to Welding	3

Gas Tungsten Arc Plate and Pipe Welding (180 hours) Certificate

The Gas Tungsten Arc Welding certificate promotes competence in welding ferrous and nonferrous materials. Emphasis is on proper use of gas tungsten arc welding (GTA) equipment setup requirements, process variables, material requirements, and welding procedures that are in compliance with industry standards.

Requirements for Certificate		9 Units
WELD 130	Gas Tungsten Arc Welding	3
WELD 300	Introduction to Welding	3
WELD 332	Gas Tungsten Arc Welding (Pipe)	3

Shielded Metal Arc Plate and Pipe (270 hours) Certificate

The Shielded Metal Arc Welding plate and pipe certificate promotes competence in plate and pipe welding. Emphasis is on power sources, electrode selection on various joint designs, techniques, and positions in welding. Instruction includes safety and proper procedures in making fillet and groove welds that are in compliance with structural and pipe welding codes.

Requirements for Certificate		12 Units
WELD 300	Introduction to Welding	3
WELD 320	Shielded Metal Arc Welding (Stick Electrode Welding)	3
WELD 321	Shielded Metal Arc Welding (Stick Electrode Welding)	3
WELD 322	Advanced Pipe Welding in Shielded Metal Arc	3

Welding Metallurgy and Inspection (270 hours) Certificate

The Welding Metallurgy and Inspection certificate provides the science of metallurgy and weld inspection. Emphasis is on the identification and selection of irons and steel, mechanical and physical properties of metals and crystal structures of metals, rules and regulations of the welding construction industry, and principles, requirements and methods of inspection.

Requirements for Certificate		14 Units
WELD 102	Introduction to Welding Metallurgy	3
WELD 116	Welding Inspection	2
WELD 117	Ultrasonic Testing Level One	3
WELD 118	Ultrasonic Testing Level Two	3
WELD 300	Introduction to Welding	3

WELD 101 Introduction to Welding and Cutting 1 Unit

Prerequisite: Acceptance into a registered apprenticeship program.

Hours: 9 hours LEC; 27 hours LAB

This course is an introduction to welding processes for apprentices. Shielded metal arc, oxyacetylene cutting on joint designs, and positions used in industry are taught. Safety in arc welding and oxyacetylene cutting is also covered.

WELD 102 Introduction to Welding Metallurgy 3 Units

Prerequisite: WELD 300.

Hours: 54 hours LEC; 36 hours LAB

This course introduces production of iron and the manufacture of iron and steel in shapes and forms used in industry. The focus is on identification and selection of irons and steels, mechanical and physical properties of metals, and crystal structure of metals. Additionally failure and deformation, the heat treating of steel, and the metallurgy of welds will be covered.

WELD 103 Gas Metal Arc Welding of Sheet Steel 1.5 Units

Prerequisite: None

Hours: 18 hours LEC; 27 hours LAB

This course covers technique application and joint design used in the auto body repair and sheet steel manufacturing industries. Sheet steel applications in the areas of steel decks, panels, storage racks, and joint framing members are presented using Gas Metal Arc Short Circuit Transfer process. Proper safety welding techniques are also covered.

WELD 104 Introduction to Metal Fabrication and Sculpture .5-3 Units

Same As: ART 120.

Prerequisite: None

Hours: 0-36 hours LEC; 27-54 hours LAB

This course covers metal sculpture techniques, design principles and materials used for sculpture, functional and nonfunctional art forms, on ferrous and non-ferrous metals. Techniques on the major welding processes such as shielded metal arc, gas metal arc, gas tungsten arc and oxy-acetylene are an integral part of the course as well as related safety issues. Different artists and topics are covered each semester. ART 120 and /or WELD 104 may be taken 4 times for a total of 6 units.

WELD 107 Welding Equipment Maintenance 2 Units

Prerequisite: None

Hours: 27 hours LEC; 27 hours LAB

This course covers the basics of welding equipment maintenance, troubleshooting and repair. Electrical and electronically controlled circuits are discussed and tested. Overall theory of operation and safety are presented as well as maintenance scheduling, and the use of electronic test equipment and other measuring devices. A field trip is required.

WELD 115 Code Welding 2 Units

Prerequisite: WELD 300 with a grade of "C" or better.

Hours: 18 hours LEC; 54 hours LAB

This course provides individualized training for welder performance qualification. Welders select the code, metal, process, and position to be used. Code and test requirements are presented. This course may be taken four times for credit using a different code, metal, process, or position.

WELD 116 Welding Inspection 2 Units

Prerequisite: WELD 300.

Hours: 36 hours LEC

This course covers the welding requirements for any type of welded structure made from commonly used carbon and low-alloy steel construction. It includes the rules and regulations for the welding construction industry and the principles, requirements, and methods of inspection. Weld measurement and discontinuities for evaluation acceptance using a variety of tools are taught.

WELD 117 Ultrasonic Testing Level One 3 Units

Prerequisite: None

Hours: 45 hours LEC; 27 hours LAB

This course covers the theory, technique application, and evaluation techniques used in the material processing, welding, and inspection industries. Ultrasonic testing as applied to industry practices such as building construction, aeronautics, shipbuilding, materials fabrication, and many others are covered. Proper safety techniques are also covered. Successful completion of this course certifies that the requirements of ASNT TCI-A for UT level 1 are met.

WELD 118 Ultrasonic Testing Level Two 3 Units

Prerequisite: WELD 117 with a grade of "C" or better.

Hours: 45 hours LEC; 27 hours LAB

This course covers advanced theory, technique application, and evaluation techniques used in the material processing, welding, and inspection industries. Advanced ultrasonic testing as applied to industry practices such as building construction, aeronautics, shipbuilding, materials fabrication and many others are covered. Proper safety techniques are also covered. Successful completion of this course certifies that the requirements of ASNT TCI-A for UT level II are met.

WELD 123 Welding Certification to D1.5 Bridge Code 1 Unit

Prerequisite: WELD 320 with a grade of "C" or better.

Hours: 9 hours LEC; 27 hours LAB

This course covers the welding requirements of the American Association of State Highway and Transportation Officials (AASHTO) for welded highway bridges made from carbon and low-alloy constructional steels. It includes the general requirements for welder certification under this code. This course provides welding procedures for certification in accordance with ANSI/AASHTO/AWS D1.5 Bridge Welding Code, an American National Standard.

WELD 130 Gas Tungsten Arc Welding 3 Units

Formerly: WELD 64

Prerequisite: None

Corequisite: WELD 300.

Hours: 36 hours LEC; 54 hours LAB

This course covers tungsten inert gas welding of aluminum, stainless steel, and other metals used in industry.

WELD 133 Gas Metal Arc Welding, Semi-Automatic Processes 3 Units

Formerly: WELD 65A

Prerequisite: None

Corequisite: WELD 300.

Hours: 36 hours LEC; 54 hours LAB

This course will cover automatic wire feed welding covering fine through heavy wire welding on steel plate gauges of varying thickness. Joint design, gas variations and all welding positions are covered.

WELD 134 Gas Metal Arc Welding of Non-Ferrous Metals 2 Units

Formerly: WELD 65B

Prerequisite: WELD 133 with a grade of "C" or better.

Hours: 18 hours LEC; 54 hours LAB

This course will cover semiautomatic wire feed welding covering fine through heavy wire welding on non-ferrous steel plate gauge of varying thickness. Joint design, gas variations and all welding positions are covered. Emphasis is on aluminum, stainless steels, and mixtures of gases. Introduction to open groove plate and pipe of mild steel using Gas Metal Arc and Flux Cored Arc Welding processes. A performance qualification test is optional at end of course.

WELD 135 Gas Metal Arc Welding (GMAW)-Pipe 3 Units

Prerequisite: WELD 133.

Hours: 36 hours LEC; 54 hours LAB

The course will cover the areas of low-pressure heating, air-conditioning, refrigeration, and water supply as well as some gas and chemical systems. The short circuit metal transfer will be used on all gas metal arc welding (GMAW) pipe connection.

WELD 140 Mathematics for Welding Technicians 3 Units

Formerly: WELD 66A

Prerequisite: None

Hours: 54 hours LEC

This course covers practical mathematics as they are applied to technical and trade work. It involves applying mathematics principles to the welding trade. Areas covered are common fractions, decimal fractions, percentages, practical algebra, rectangles, triangles, metric measurement, measuring instruments, strength of materials and essentials of trigonometry. Problems involving labor and cost of material are also covered. AA/AS area 3D and 4C.

WELD 150 Employability Skills for Technical Careers 2 Units

Same As: AT 107 and ET 250.

Prerequisite: None

Hours: 36 hours LEC

This course provides the opportunity of exploring technical careers while developing valuable work and life skills. It is an introduction to a variety of technically-related occupations. Emphasis is placed on exploring technical careers in the Sacramento area. Activities are designed to enhance personal development, employability skills, and self esteem through leadership, citizenship, and character development. Not open to students who have completed AT 107 or ET 250. AA/AS area E2.

WELD 290 Advanced Student Projects 2 Units

Prerequisite: WELD 300 with a grade of "C" or better.

Hours: 108 hours LAB

This course provides an opportunity to pursue advanced projects selected by the welding department. This course may be taken twice for credit.

WELD 294 Topics in Welding .5-5 Units

Prerequisite: To be determined for each topic.

Hours: 9-90 hours LEC; 27-270 hours LAB

Individualized course developed in cooperation with industry to meet specialized training needs. This course may be taken four times with different topics.

WELD 300 Introduction to Welding 3 Units

Prerequisite: None

Course Transferable to CSU

Hours: 36 hours LEC; 54 hours LAB

This course is an introduction to welding processes: shielded metal arc, gas metal arc, flux-cored gas shield and self shield, gas tungsten arc, oxyacetylene cutting and welding on joint designs and positions used in industry. Safety in arc, oxyacetylene welding and cutting is also covered.

WELD 320 Shielded Metal Arc Welding (Stick Electrode Welding) 3 Units

Prerequisite: WELD 300 with a grade of "C" or better.

Course Transferable to CSU

Hours: 36 hours LEC; 54 hours LAB

This course will cover pre-employment training for welding technicians. Emphasis on developing manipulative proficiency in the use of shielded metal-arc welding in the flat, horizontal, vertical and overhead positions on light and heavy gauge material. Emphasis will also be placed on groove welding of plate, limited and unlimited thickness in accordance with D1.1 Structural Welding Code. May be taken twice for credit.

WELD 321 Shielded Metal Arc Welding (Stick Electrode Welding) 3 Units

Formerly: WELD 62B

Prerequisite: WELD 320 with a grade of "C" or better.

Course Transferable to CSU

Hours: 36 hours LEC; 54 hours LAB

This is a continuation of skills and content begun in Welding 320. Emphasis will also be placed on pipe welding procedures and welding techniques. May be taken twice for credit.

