

Welding

Overview

The CRC welding program is designed for students interested in seeking employment or advancing employment in welding fabrication and industrial repairs. Current job statistics show a long-term and growing industry demand for skilled welders with very good pay for those with experience. Welding encompasses study in electrical, metallurgy, chemistry, physics, design, and mechanical engineering.



Program Maps

[Welding, A.S. Degree \(/crc/main/doc/programs/program-maps/weld-as-degree-ho.pdf\)](/crc/main/doc/programs/program-maps/weld-as-degree-ho.pdf)

[Welding Code, Certificate of Achievement \(/crc/main/doc/programs/program-maps/weld-code-cert-ho.pdf\)](/crc/main/doc/programs/program-maps/weld-code-cert-ho.pdf)

[Welding Technology, Certificate of Achievement \(/crc/main/doc/programs/program-maps/weld-cert-ho.pdf\)](/crc/main/doc/programs/program-maps/weld-cert-ho.pdf)

[Welding Fabricator, Certificate of Achievement \(/crc/main/doc/programs/program-maps/weld-fabricator-cert.pdf\)](/crc/main/doc/programs/program-maps/weld-fabricator-cert.pdf)

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Career and Academic Community [Automotive, Construction and Design Technology \(/academics/career-and-academic-communities/automotive-construction-and-design-technology\)](/academics/career-and-academic-communities/automotive-construction-and-design-technology)

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Associate Degrees

A.S. in General Agriculture

Agriculture is a vital component of our local, state, and national economies and offers many exciting employment opportunities. In addition to the production of a wide range of valuable

agricultural commodities, the Sacramento region is home to numerous multi-national agricultural corporations and statewide governmental agencies. It is also a center for international agricultural trade and commerce. This program is designed for students majoring in Agriculture while also allowing the student to select courses that fit his/her individual needs and desires.

As a General Agriculture major, you will:

*Study a general agriculture curriculum representing all of the departments of the Cosumnes River College agriculture program including: agriculture business, horticulture, welding, veterinary technology and plant science.

*Develop your leadership and communication skills.

*Identify the agricultural career you are most interested in and build a course of study to better qualify you for a profession.

HIGHLIGHTS

*As the only community college agriculture program in the Sacramento region, the CRC General Agriculture program provides an excellent opportunity for individuals who wish to pursue a career in agriculture and receive a General Agriculture Associate of Science degree.

*The faculty in this program works closely with the five California agricultural degree offering universities to provide a quality program for students interested in agriculture business, management and economics.

*The Sacramento region is fortunate to have some of the best high school agriculture programs in California. The faculty in the CRC Ag program works closely with these feeder schools to articulate coursework and facilitate the successful transition of agriculture students from high school to the university.

*Internships in agriculture are available for students interested in work experience opportunities.

NOTE TO TRANSFER STUDENTS: If you are interested in transferring to a four-year college or university to pursue a bachelor's degree in this major, it is critical that you meet with a CRC counselor to select and plan the courses for your major. Schools vary widely in terms of the required preparation. The courses that CRC requires for an Associate's degree in this major may be different from the requirements needed for the Bachelor's degree.

Catalog Date: June 1, 2020

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
AGB 310	Agriculture Computer Applications	3 ¹
AGB 320	Agriculture Accounting	3
AGB 321	Agriculture Economics	3
AMT 306	Small Engine Repair	3
HORT 300	Introduction to Horticulture	3
PLTS 310	Soils, Soil Management, and Plant Nutrition (3)	3
or HORT 302	Soils, Soil Management, and Plant Nutrition (3)	
ANSC 300	Introduction to Animal Science	3
PLTS 300	Introduction to Plant Science	3
WELD 100	Introduction to Welding	3
A minimum of 2 units from the following:		2
WEXP 498	Work Experience in (Subject) (1 - 4)	
Subtotal Units:		29

Agriculture Business

COURSE CODE	COURSE TITLE	UNITS
AGB 300	Introduction to Agriculture Business	3
AGB 330	Agriculture Sales and Communication	3
AGB 331	Agriculture Marketing	3
Agriculture Business Units:		9
Total Units:		38

Horticulture

COURSE CODE	COURSE TITLE	UNITS
HORT 305	Plant Identification-Fall Selections	3
HORT 312	Plant Propagation	3
Horticulture Units:		6
Total Units:		35

Landscape

COURSE CODE	COURSE TITLE	UNITS
HORT 320	Sustainable Landscape Construction	3
HORT 324	Sustainable Landscape Maintenance	3
Landscape Units:		6
Total Units:		35

Welding

COURSE CODE	COURSE TITLE	UNITS
WELD 110	Advanced Shielded Metal Arc Welding	4
Welding Units:		4
Total Units:		33

¹This major requires that you complete all courses in the required program plus one area of concentration.

The General Agriculture 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 CRC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- PSLO 1: Demonstrate knowledge and hands-on experience in the basic concepts of all aspects of agriculture.
- PSLO 2: Demonstrate the ability to logically breakdown aspects of a project/problem and be able to resolve an issue in the agriculture industry.
- PSLO 3: Demonstrate independent & group learning expressing effective communication skills, both orally & written.
- PSLO 4: Participate in leadership opportunities to develop life-long learning traits.

Career Information

Management; Supervision; Finance; Insurance; Government; Marketing; Distribution; International Trade; Sales and Service Nursery Management and Operations; Park Maintenance; Landscape Design, Teaching, Communication; Contracting & Maintenance; Fertilizer & Insecticide Application; Research; Retail/Wholesale; Estimator; Consultant; Government Agency employee; Welding Technician; Inspection; Welding Engineering; Sculpting; Home/Handicraft & Hobby; Construction; Trucking & Automotive Some positions, however, require a four-year degree for which CRC's program is a good base for transfer.

A.S. in Welding Technology

The Welding Program at Cosumnes River College specializes in welding training to meet current needs for the Welding Industry. In addition to learning technical welding skills of Shielded Metal Arc, Gas Metal Arc, Gas Tungsten Arc and Flux Core Arc Welding processes, students will be introduced to safety standards, common metal working machinery and welding practices common with the welding industry.

Catalog Date: June 1, 2020

Degree Requirements

COURSE CODE	COURSE TITLE	UNITS
WELD 100	Introduction to Welding	3
A minimum of 8 units from the following:		8
WELD 110	Advanced Shielded Metal Arc Welding (4)	
WELD 111	Basic Pipe Welding Procedures (4)	
WELD 113	Basic Flux Core Welding Procedures (4)	
A minimum of 9 units from the following:		9
WELD 126	Gas Metal Arc Welding of Plate & Pipe (3)	
WELD 127	Gas Metal Arc Welding Process of Sheet Metal (3)	
WELD 128	Gas Tungsten Arc Welding of Aluminum Alloys (3)	
WELD 129	Gas Tungsten Arc Welding of Stainless Steel (3)	
A minimum of 5 units from the following:		5
WELD 298	Work Experience in Welding (1 - 4)	
WELD 145	Basic Welding Shop Fabrication Skills (3)	
WELD 151	Welding Industry Training (4)	
Total Units:		25

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 CRC graduation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- Demonstrate welding skills to meet or exceed Industry Standards. PSLO #1
- Understand and implement Welding Procedures and Welding Specifications to meet or exceed the Welding Code Standards. PSLO #2
- Understand and implement Cal-OSHA and FED-OSHA Safety Regulations and Procedures that pertain to the Welding Industry. PSLO #3
- Apply academic skills in reading, mathematics, chemistry, physics, business, communication, engineering design and concepts to welding fabrication. PSLO #4
- Demonstrate work attributes that contribute to personal success and contribute to the goals of the company or organization for which one is employed. PSLO #5

Career Information

Production Shop Welder Production Field Welder Welding Fabricator Welding Safety Trainer Welding Inspector Welding Quality Control Supervisor Welding Supervisor Welding Teacher (High-School) Welding Instructor (Trade or College) Welding Sales Welding Safety Owner or Operator of a welding business Manager of a welding business

Certificates of Achievement

Welding Code Certificate

The Welding Code Certificate specializes in the American Welding Society Structural Steel Welding Code (D1.1) and Seismic Welding Code (D1.8). Students have the option to select one of the three courses; Flux Core Arc Welding, Shielded Metal Arc Welding and Pipe Welding procedures as a focus course to prepare to take the Certified Welding Inspector (CWI) exam at an AWS testing site. Students may take all of the focus courses to assist with preparing for the CWI exam, but only one of the optional courses is needed to earn the certificate.

Catalog Date: June 1, 2020

Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
A minimum of 4 units from the following:		4
WELD 110	Advanced Shielded Metal Arc Welding (4)	
WELD 111	Basic Pipe Welding Procedures (4)	
WELD 113	Basic Flux Core Welding Procedures (4)	
WELD 151	Welding Industry Training	4
Total Units:		8

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- PSLO 1: Demonstrate welding skills sufficient to meet industry standards.
- PSLO 2: Identify and recall American Welding Society Structural Steel regulations pertaining to construction and or fabrication of weldments.

Career Information

Job advancement in the welding industry as a welder, quality control inspector or welding supervisor. Certified Welding Inspector Certified Welding Supervisor Certified Welding Educator

Welding Fabricator Certificate

The Welding Fabricator Certificate specializes in up to date welding code and safety regulations, modern power sources and techniques, fabrication procedures with the Gas Metal Arc Welding Process and the Gas Tungsten Arc Welding Process. Students will have the opportunity to meet or exceed industry standards in-order to become employed in the welding industry.

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Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
WELD 145	Basic Welding Shop Fabrication Skills	3
A minimum of 7.5 units from the following:		7.5
WELD 125	Introduction to the Gas Metal Arc Welding Process (1.5)	
WELD 126	Gas Metal Arc Welding of Plate & Pipe (3)	
WELD 127	Gas Metal Arc Welding Process of Sheet Metal (3)	
WELD 128	Gas Tungsten Arc Welding of Aluminum Alloys (3)	
WELD 129	Gas Tungsten Arc Welding of Stainless Steel (3)	

COURSE CODE	COURSE TITLE	UNITS
WELD 160	Welding Technology for the Automotive Industry (1.5)	
Total Units:		10.5

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- PSLO #1: Fabrication and Certification: Use proper hand, measuring and layout tools to fabricate welding projects or certification coupons.
- Be able to properly and accurately measure a welding bead with a fillet weld gage.
- Be able to properly measure the height of a welding bead with a "V Wac" gage or "Bridge Cam" gage.
- PSLO #2: Professionalism: Demonstrate work attributes that contribute to personal success and contribute to the goals of the company or organization for which one is employed.
- Be able to be a team player who shows up to work on time.

Career Information

Job advancement and or employment in the welding industry.

Welding Technology Certificate

The CRC welding program is designed for students interested in seeking employment or advancing employment in welding fabrication and industrial repairs.

Current job statistics show a long-term and growing industry demand for skilled welders with very good pay for those with experience in Gas Metal Arc Welding, Shielded Metal Arc Welding and Flux Core Arc Welding talents.

Welding encompasses study in Electrical, Metallurgy, Chemistry, Physics, Design, and Mechanical Engineering.

This welding certificate can be used in conjunction with other technology areas such as:

- * Automotive Mechanics Technology
- * Building Inspection Technology
- * Construction Management Technology

Highlights include:

- * Classes for beginning and advanced welders
- * Welder Operator Qualification Records
- * Hands-on experience and opportunities for participation in student projects

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Certificate Requirements

COURSE CODE	COURSE TITLE	UNITS
WELD 100	Introduction to Welding	3
A minimum of 13 units from the following:		13
WELD 125	Introduction to the Gas Metal Arc Welding Process (1.5)	
WELD 160	Welding Technology for the Automotive Industry (1.5)	
WELD 110	Advanced Shielded Metal Arc Welding (4)	
WELD 111	Basic Pipe Welding Procedures (4)	
WELD 113	Basic Flux Core Welding Procedures (4)	
WELD 126	Gas Metal Arc Welding of Plate & Pipe (3)	
WELD 127	Gas Metal Arc Welding Process of Sheet Metal (3)	
WELD 128	Gas Tungsten Arc Welding of Aluminum Alloys (3)	
WELD 129	Gas Tungsten Arc Welding of Stainless Steel (3)	
WELD 295	Independent Studies in Welding (1 - 3)	
WELD 151	Welding Industry Training (4)	
WELD 145	Basic Welding Shop Fabrication Skills (3)	
WELD 298	Work Experience in Welding (1 - 4)	
Total Units:		16

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- PSLO #1: Demonstrate welding skills sufficient to meet industry standards.
- PSLO #2: Apply integrated knowledge with incremental skill improvement resulting in functional application of welding techniques.
- PSLO #3: Interpret safety codes and regulations that pertain to the welding industry.
- PSLO #4: Use proper hand, measuring and layout tools to fabricate welding projects or certification coupons.
- PSLO #5: Demonstrate work attributes that contribute to personal success and contribute to the goals of the company or organization for which one is employed.

Career Information

Welding Technician; Sales; Inspection; Supervision & Management; Welding Engineering; Welding Teacher; Welding Safety Trainer; Sculpting; Home/Handicraft & Hobby; Construction; Trucking & Automotive

Welding (WELD) Courses

WELD 100 Introduction to Welding

Units:	3
Hours:	36 hours LEC; 54 hours LAB
Prerequisite:	None.
Catalog Date:	June 1, 2020

This is an introductory course that covers the safety procedures of operating an electric arc welding machine, oxygen-acetylene cutting torch, oxygen-propane cutting and heating torch, plasma arc cutting, flux core arc welding, gas metal arc welding and the gas tungsten arc welding process. The course also includes the scientific theory of welding and cutting, modern power sources, welding symbols, proper joint design, the proper welding procedures and techniques for all types of welding and cutting processes.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Demonstrate welding skills sufficient to meet industry standards.
- The student will perform basic fillet weld beads in the flat position with the GMAW, GTAW, SMAW and the FCAW process.
- SLO 2: Apply integrated knowledge with incremental skill improvement resulting in functional application of welding techniques.
- The student will demonstrate an understanding of basic welding skills by being able to identify and explain the technical differences of the SMAW, GMAW, GTAW and the FCAW processes.
- The student will demonstrate the ability to use a welding machine's owner's manual as a reference guide to produce a sound weld bead.
- SLO 3: Use proper hand, measuring and layout tools to fabricate welding projects.
- Demonstrate proper use of hand and power tools by changing out high pressure welding cylinders, setting up and shutting down an oxygen fuel outfit and performing a safety inspection of the equipment.
- Demonstrate proper use of a tape measure, carpenter square and soap stone to layout and cut material with various shop tools to specific dimensions to complete the welding assignments.
- SLO 4: Demonstrate knowledge of Cal OSHA regulations pertaining to the welding industry.
- Demonstrate how to safely operate high-pressure gas cylinders and regulators for welding and cutting operations per manufacturer's recommendations.
- Demonstrate how to safely adjust, ignite and shut down a cutting torch or welding torch to manufacturer's recommended procedures.
- Demonstrate how to safely prepare and handle oxygen and acetylene cylinders, regulators, cutting and welding attachments for transportation and long term storage conditions.

WELD 110 Advanced Shielded Metal Arc Welding

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	WELD 100 or 160 with a grade of "C" or better
Catalog Date:	June 1, 2020

The WELD 110 advanced welding course specializes in vertical up and overhead welding procedures with the shielded metal arc welding (SMAW) process. Students will be introduced to current welding code regulations for structural steel, bridge and seismic applications with the SMAW process. Students will learn welding parameters, distortion, pre-heat and post-heat procedures, acceptable code procedures and practices. Laboratory assignments will prepare students to be successful in the WELD 151 Industry Training course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Demonstrate welding skills that meet industry certified welder standards.
- perform the proper welding procedures and techniques with the Shielded Metal Arc Welding (SMAW) and the Flux Core Arc Welding (FCAW) process.
- produce code-quality welds with the SMAW or FCAW process.
- demonstrate the ability to manipulate the welding arc of the SMAW or FCAW process to significantly reduce, if not eliminate undercut, porosity, slag inclusion, and inconsistent weld bead profile.
- explain the technical function of shielding gas for the SMAW process.
- identify, analyze and manipulate welding parameters to produce an AWS D1.1 acceptable weld bead with the SMAW and FCAW process.
- SLO 2: Apply integrated knowledge with incremental skill improvement resulting in functional application of welding techniques.
- explain the technical function of shielding gas for the FCAW process.
- identify the technical differences of the electrode alloy content and flux elements of the SMAW and FCAW processes.
- explain the theoretical and set-up procedures for a constant voltage and a constant current power supplies.
- read and understand any manufacturer's operating manual as a resource guide to safely operate any given welding machine.
- reference welding manufacturer's websites to research welding electrode consumable data required to complete a welding procedure specification document.
- demonstrate standard certification procedures by using a welding procedure specification document to attain certification.

- SLO 3: Use proper hand, measuring and layout tools to fabricate welding projects.
- demonstrate how to correctly inspect welds for accuracy, weld profile characteristics and identify any rejectable weld discontinuities.
- SLO 4: Demonstrate knowledge of Cal OSHA regulations that pertain to the welding industry.
- demonstrate the safe operating procedures for an oxygen acetylene cutting torch, plasma cutting torch, hydraulic shearing and punching tool and a mechanical metal cutting shear.
- demonstrate effective safety inspections of tools, equipment and personal protective equipment.
- SLO 5: Demonstrate work attributes that contribute to personal success and contribute to the goals of the company or organization for which one is employed.
- effectively communicate with other welders, production or schedule supervisors, welding inspectors and safety personnel to effectively and efficiently perform code quality welding.

WELD 111 Basic Pipe Welding Procedures

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	WELD 100 or 160 with a grade of "C" or better; The student needs safety training on gas cutting equipment and electric arc welding machinery to be eligible for the WELD 111 course.
Catalog Date:	June 1, 2020

Basic Pipe Welding Procedures covers personal safety, hand and power tool safety, machinery safety and operational procedures for preparing metal for welding. The student will be introduced to the proper procedures of beveling pipe with a cutting torch and grinder, welding in the 5G and 6G positions with the SMAW, FCAW, GMAW or the GTAW process. The course will also include Metallurgy, Materials, Fabrication, Welding Codes, Industry Standards, Welding Procedures and Welding Inspection procedures. Laboratory assignments will allow students to focus on pipe to pipe fit-up and welding bead quality to meet or exceed industry standards.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO #1: Demonstrate welding skills sufficient to meet industry standards (Program Learning Outcome #1).
- The student must be able to perform a surface weld on 8" pipe with E6010 electrode
- The student must be able to perform a surface weld on 8" pipe with E7018 electrode.
- SLO #2: Develop safe work habits and skills with welding tools and machinery for a safe welding procedures and practices for a long term career in the welding industry (Program Learning Outcome #3).
- The student must be able to properly setup and shut down an oxygen acetylene cutting torch apparatus safely.
- The student must be able to safely shear metal with various hydraulic and power actuated shears.
- SLO #3: Utilize proper hand, measuring and layout tools to fabricate welding projects (Program Learning Outcome #4).
- The student must be able to measure a pipe bevel angle with a protractor.
- The student must be able to measure a weld bead height with a "V wac" gauge within a 1/32" tolerance.

WELD 113 Basic Flux Core Welding Procedures

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	WELD 100 or 160 with a grade of "C" or better
Catalog Date:	June 1, 2020

The flux core arc welding process course provides training to develop semi-automatic welding skills on carbon steel plate to structural welding code standards. Topics include safety training, welding inspection and testing procedures with various size diameter flux cored electrodes, with and without external shielding gas, in all positions on fillet and groove welds. The laboratory assignments will prepare the student for the WELD 151 Industrial Training course.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Demonstrate welding skills that meet industry standards.
- Perform the proper welding procedures and techniques with the Flux Core Arc Welding (FCAW) process.
- Produce code-quality welds with the FCAW process.
- Demonstrate the ability to manipulate the welding arc of the FCAW process to significantly reduce, if not eliminate undercut, porosity, slag inclusion, and inconsistent weld bead profile.
- Identify, analyze and manipulate welding parameters to produce an AWS D1.1 acceptable weld bead with the FCAW process.
- SLO 2: Use proper hand, measuring and layout tools to fabricate welding projects.
- Demonstrate how to correctly inspect welds for accuracy, weld profile characteristics and identify any rejectable weld discontinuities.
- SLO 3: Apply integrated knowledge with incremental skill improvement resulting in functional application of welding techniques.
- Explain the technical function of shielding gas for the FCAW process.
- Identify the technical differences of the electrode alloy content and flux elements of the FCAW processes.
- Explain the theoretical and set-up procedures for a constant voltage and a constant current power supplies.
- Read and understand any manufacturer's operating manual as a resource guide to safely operate any given welding machine.
- Reference welding manufacturer's websites to research welding electrode consumable data required to complete a welding procedure specification document.

WELD 125 Introduction to the Gas Metal Arc Welding Process

Units:	1.5
Hours:	18 hours LEC; 27 hours LAB
Prerequisite:	None.
Catalog Date:	June 1, 2020

The Gas Metal Arc Welding (GMAW) course is an introductory welding course designed for the career or non-career welding student who requires the proper safety training and welding procedures to perform the GMAW process to meet industry safety and welding standards.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Demonstrate welding skills sufficient to meet industry standards. (PSLO #1)
- Perform a 2F welding coupon with the GMAW process safely on plate
- Perform a 3F Down welding coupon with the GMAW process safely on plate
- SLO 2: Utilize proper hand, measuring and layout tools to fabricate welding projects. (PSLO #3)
- Measure a fillet weld properly.
- Measure the bead height on a groove weld properly.

WELD 126 Gas Metal Arc Welding of Plate & Pipe

Units:	3
Hours:	36 hours LEC; 54 hours LAB
Prerequisite:	None.
Catalog Date:	June 1, 2020

Gas Metal Arc Welding process of Plate and Pipe focuses on safety, hand and power tools, machinery, welding parameters, welding code and power supplies. The laboratory assignments will allow students to focus on proper preparation methods and welding techniques to perform correct pipe to pipe connections to meet or exceed industry standards.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Demonstrate welding skills sufficient to meet industry standards. (PSLO #1)
- Perform a 2F welding coupon with the GMAW process on plate
- Perform a 3F welding coupon with the GMAW process on plate
- SLO 2: Utilize proper hand, measuring and layout tools to fabricate welding projects. (PSLO #3)
- Measure a fillet weld properly.
- Measure the bead height on a groove weld properly.

WELD 127 Gas Metal Arc Welding Process of Sheet Metal

Units:	3
Hours:	36 hours LEC; 54 hours LAB
Prerequisite:	None.
Catalog Date:	June 1, 2020

Gas Metal Arc Welding Process of sheet metal is a welding course that specializes in the safety, shop hand and power tools, machinery, power supplies, welding codes and welding techniques of the Gas Metal Arc Welding process. Laboratory assignments will be completed on medium carbon steel, aluminum alloy or stainless steel sheet-metal to meet industry standards. AWS, ASME and API Qualifications may be issued by the employer, not the college welding program.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO #1: Demonstrate welding skills sufficient to meet industry standards. (PSLO #1)
- Perform a 2F welding coupon with the GMAW process.
- Perform a 3F Up welding coupon with the GMAW process.
- SLO #2: Apply integrated knowledge with incremental skill improvement resulting in functional application of welding techniques. (PSLO #2)
- Perform a fillet weld in the horizontal position and use those learned skills to perform a 3F Up, 3F Down or 4F weld.
- SLO #3: Use proper hand, measuring and layout tools to fabricate welding projects. (PSLO #3)
- Measure a fillet weld properly.
- Measure the bead height on a groove weld properly.
- Develop safe work habits and skills with welding tools and machinery for a safe long term career in the welding industry.

WELD 128 Gas Tungsten Arc Welding of Aluminum Alloys

Units:	3
Hours:	36 hours LEC; 54 hours LAB
Prerequisite:	WELD 100 or 160 with a grade of "C" or better
Catalog Date:	June 1, 2020

Gas Tungsten Arc Welding of Aluminum Alloy focuses on welding safety, shop tools and machinery, welding codes, welding inspection, power supplies, welding technique and welding parameters. Laboratory assignments will be completed with the Gas Tungsten Arc Welding process with modern inverter power supplies on Aluminum Alloy material to prepare students for employment in the welding industry. AWS, ASME and API Qualifications may be issued by the employer, not the college welding program.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO #1: Demonstrate welding skills sufficient to meet industry standards. (PSLO #1)
- Perform a 2F welding coupon with the GTAW process.
- Perform a 1G welding coupon with the GTAW process.
- SLO #2 Interpret safety codes and regulations that pertain to the welding industry. (PSLO #3)
- Have a basic understanding of OSHA safety regulations with high pressure cylinders.
- Have a basic understanding of personal protective equipment for welding operators.
- SLO #3: Use proper hand, measuring and layout tools to fabricate welding projects or certification coupons. (PSLO #4)
- Accurately use a tape measure to layout metal for student projects.
- Accurately measure a fillet weld.

WELD 129 Gas Tungsten Arc Welding of Stainless Steel

Units:	3
Hours:	36 hours LEC; 54 hours LAB
Prerequisite:	WELD 100 or 160 with a grade of "C" or better
Catalog Date:	June 1, 2020

Gas Tungsten Arc Welding of stainless steel focuses on welding safety, shop tools and machinery, welding codes, welding inspection, power supplies, welding technique and welding parameters. Laboratory assignments will be completed with the Gas Tungsten Arc Welding process with modern inverter power supplies on stainless steel material. AWS, ASME and API Qualifications may be issued by the employer, not the college welding program.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO #1: Demonstrate welding skills sufficient to meet industry standards. (PSLO #1, Welding Skills)
- Perform a 2F welding coupon with the GTAW process.
- Perform a 1G welding coupon with the GTAW process.
- SLO #2: Interpret safety codes and regulations that pertain to the welding industry. (PSLO #3, Codes and Regulations)
- Recall and identify OSHA safety regulations with high pressure cylinders.
- Demonstrate a basic understanding and usage of personal protective equipment for welding operators.
- SLO #3: Use proper hand, measuring and layout tools to fabricate welding projects or certification coupons. (PSLO#4, Fabrication and Certification)
- Demonstrate the accurate use of a tape measure to layout metal for projects.
- Measure a fillet weld properly.

WELD 145 Basic Welding Shop Fabrication Skills

Units:	3
Hours:	36 hours LEC; 54 hours LAB
Prerequisite:	None.
Catalog Date:	June 1, 2020

Basic Welding Shop Fabrication (WELD 145) The basic course provides the student the opportunity to design projects with pencil and paper sketches or computer assisted drawing prints with inch or metric measurement standards. The sketches or blueprints will include proper welding symbols, weld bead size and welding parameters common to industry standards. Each project is specifically selected by the student and professor based on skill level, available funds, student skills and applicable welding processes.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Apply integrated knowledge with incremental skill improvement resulting in functional application of welding techniques.
- Demonstrate the ability to design a project with a pencil and paper
- Demonstrate the ability to design a project with a computer assisted drawing program.
- SLO 2: Use proper hand, measuring and layout tools to fabricate welding projects.

- The student shall be able to measure metal with a standard or metric tape measure.
- The student shall be able to properly use hand tools like a hacksaw, drill and grinder to perform fabrication projects.

WELD 151 Welding Industry Training

Units:	4
Hours:	54 hours LEC; 54 hours LAB
Prerequisite:	WELD 110, 111, 113, 126, 127, 128, or 129 with a grade of "C" or better
Catalog Date:	June 1, 2020

The WELD 151 Welding Industry Training course is an advanced welding course that prepares students for immediate employment in the welding industry. Students will focus on specific welder qualification procedures to meet industry standards. Students will be able to practice on an industry standard welder qualification procedure in the Shielded Metal Arc Welding process (SMAW), Flux Core Arc Welding process (FCAW), Gas Metal Arc Welding process (GMAW) and Gas Tungsten Arc Welding process (GTAW) during the laboratory portion of the course. The purpose of the WELD 151 course is to prepare the student for a pre-employment qualification welding test that is specific to an industry standard at the desired location of employment. AWS, ASME and API qualifications will be issued by the employer, not the college welding program.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Demonstrate welding skills sufficient to meet industry welding standards.
- Produce code quality welds with the Gas Metal Arc Welding Process (GMAW), Gas Tungsten Arc Welding Process (GTAW), Shielded Metal Arc Welding Process (SMAW) and or the Flux Core Arc Welding process (FCAW).
- Identify, analyze and correct welding parameters to produce a suitable weld bead with the GMAW, GTAW, SMAW and or the FCAW process.
- Apply and manipulate the welding arc of the GMAW, GTAW, SMAW and or the FCAW process to significantly reduce undercut, porosity, cold lap and other common welding defects.
- SLO 2: Identify and apply proper hand, measuring and layout tools to fabricate welding projects.
- Inspect welds for accurate weld size, acceptable weld profile and identify any weld discontinuities to the latest welding code common to the welding industry.
- SLO 3: Identify and recall American Welding Society Structural Steel regulations pertaining to construction, manufacturing or fabrication.
- Interpret safety rules and regulations and demonstrate safe welding and cutting procedures.
- SLO 4: Apply work attributes that contribute to personal success and contribute to the goals of the company or organization for which one is employed.
- Communicate effectively with other welders, production or schedule supervisors, welding inspectors and safety personnel to effectively and efficiently perform code quality welding.

WELD 160 Welding Technology for the Automotive Industry

Units:	1.5
Hours:	18 hours LEC; 27 hours LAB
Prerequisite:	None.
Catalog Date:	June 1, 2020

This is an introductory level course that addresses safety and the proper procedures pertaining to the following equipment: Oxygen Acetylene and Oxygen Propane Cutting and Heating equipment, Electric Arc Welding, Plasma Arc Cutting equipment, Gas Metal Arc Welding equipment and Gas Tungsten Arc Welding equipment. The course focuses on welding technology for the purpose of modification and/or repair of automotive related components.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Demonstrate the welding skills sufficient to meet industry standards.
- Demonstrate the basic knowledge and elementary skills of oxygen acetylene cutting, plasma arc cutting, shielded metal arc welding, gas metal arc welding, gas tungsten arc welding on Aluminum alloys.
- SLO 2: Apply integrated knowledge with incremental skill improvement resulting in functional application of welding techniques.
- Explain the technical differences of the welding and cutting processes such as the GMAW, GTAW, OFC and PAC processes.
- Identify and adjust the welding parameters for a gas metal arc welding machine and a shielded metal arc welding machine to the correct amperage, voltage, wire feed speed, shielding gas flow rate to weld the correct weld bead.
- SLO 3: Use proper hand, measuring and layout tools to fabricate welding projects.
- Develop a basic hand and eye coordination skills with basic welding tools and metalworking equipment.
- SLO 4: Demonstrate knowledge of Cal OSHA regulations pertaining to the welding industry.
- Inspect, set up, change out cylinders and regulators, safely operate, and disassemble an Oxygen-Acetylene Welding and Cutting outfit.
- Safely operate an Oxygen-Acetylene Cutting Torch to severe carbon steel plate and severe aluminum alloy with a plasma cutting machine.
- SLO 5: Demonstrate work attributes that contribute to personal success and contribute to the goals of the company or organization for which one is employed.

WELD 294 Topics in Welding

Units:	0.5 - 5
Hours:	5 - 54 hours LEC; 12 - 108 hours LAB
Prerequisite:	None.
Catalog Date:	June 1, 2020

WELD 294 is a course developed in cooperation with the industry to meet specialized training needs of the Sacramento area or specifically high demand welding processes for the welding

industry.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO 1: Demonstrate welding skills sufficient to meet industry certified welder standards.
- Apply integrated knowledge with incremental skill improvement resulting in functional application of welding techniques.
- SLO 3 Use proper hand, measuring and layout tools to fabricate welding projects.
- Demonstrate knowledge of Cal OSHA and Fed OSHA regulations pertaining to the welding industry.
- Demonstrate new advancements in power supplies and welding skills sufficient to meet industry standards.
- SLO 4: Demonstrate knowledge of Cal OSHA regulations pertaining to the welding industry.

WELD 295 Independent Studies in Welding

Units:	1 - 3
Hours:	54 - 162 hours LAB
Prerequisite:	None.
Catalog Date:	June 1, 2020

An independent studies project involves an individual student or small group of students in study, research, or activities beyond the scope of regularly offered courses. See the current catalog section of "Special Studies" for full details of Independent Studies.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- SLO #1: Actively engage in intellectual inquiry beyond that required in order to pass a course of study (College Wide Learning Outcome – Area 4).
- Discuss and outline a proposal of study (that can be accomplished within one semester term) with a supervising instructor qualified within the discipline.
- Design an independent study (to be completed individually or by collaboration of a small group) to foster special knowledge, skills, and experience that are not available in any one regularly scheduled course.
- Use information resources to gather discipline-specific information.
- SLO #2: Utilize modes of analysis and critical thinking to apply theoretical perspectives and/or concepts in the major discipline of study to significant problems and/or educational activities (College Wide Learning Outcome – Area 3).
- Analyze and apply the knowledge, skills and experience that are involved in the independent study to theoretical perspectives and/or concepts in the major discipline of study.
- Explain the importance of the major discipline of study in the broader picture of society.
- SLO #3: Communicate a complex understanding of content matter of the major discipline of study (College Wide Outcome – Area 3).
- Demonstrate competence in the skills essential to mastery of the major discipline of study that are necessary to accomplish the independent study.
- SLO #4: Identify personal goals and pursue these goals effectively (College Wide Outcome – Area 4).
- Utilize skills from the "academic tool kit" including time management, study skills, etc., to accomplish the independent study within one semester term.

WELD 298 Work Experience in Welding

Units:	1 - 4
Hours:	60 - 300 hours LAB
Prerequisite:	None.
Enrollment Limitation:	Students must be in a paid or unpaid internship, volunteer position or job related to career goals in Welding.
General Education:	AA/AS Area III(b)
Catalog Date:	June 1, 2020

This course provides students with opportunities to develop marketable skills in preparation for employment in their major field of study or advancement within their career. It is designed for students interested in work experience and/or internships in associate degree level or certificate occupational programs. Course content includes understanding the application of education to the workforce; completion of required forms which document the student's progress and hours spent at the work site; and developing workplace skills and competencies. Appropriate level learning objectives are established by the student and the employer. During the semester, the student is required to participate in a weekly orientation and 75 hours of related paid work experience, or 60 hours of unpaid work experience for one unit. An additional 75 or 60 hours of related work experience is required for each additional unit. Work Experience may be taken for a total of 16 units when there are new or expanded learning objectives. Only one Work Experience course may be taken per semester.

Student Learning Outcomes

Upon completion of this course, the student will be able to:

- DEMONSTRATE AN UNDERSTANDING AND APPLICATION OF PROFESSIONAL WORKPLACE BEHAVIOR IN A FIELD OF STUDY RELATED ONE'S CAREER.(SLO 1)
- Understand the effects time, stress, and organizational management have on performance.
- Demonstrate an understanding of consistently practicing ethics and confidentiality in a workplace.
- Examine the career/life planning process and relate its relevancy to the student.
- Demonstrate an understanding of basic communication tools and their appropriate use.
- Demonstrate an understanding of workplace etiquette.
- DESCRIBE THE CAREER/LIFE PLANNING PROCESS AND RELATE ITS RELEVANCY TO ONE'S CAREER.(SLO 2)
- Link personal goals to long term achievement.
- Display an understanding of creating a professional first impression.

- Understand how networking is a powerful job search tool.
- Understand necessary elements of a résumé.
- Understand the importance of interview preparation.
- Identify how continual learning increases career success.
- DEMONSTRATE APPLICATION OF INDUSTRY KNOWLEDGE AND THEORETICAL CONCEPTS AS WRITTEN IN LEARNING OBJECTIVES IN PARTNERSHIP WITH THE EMPLOYER WORK SITE SUPERVISOR.(SLO 3)

WELD 299 Experimental Offering in Welding

Units: 0.5 - 4
Prerequisite: None.
Catalog Date: June 1, 2020

Jason Roberts

Welding Professor

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Welding, A.S. Degree

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Welding Code, Certificate of Achievement

PROGRAM MAP HERE > (</CRC/MAIN/DOC/PROGRAMS/PROGRAM-MAPS/WELD-CODE-CERT-HO.PDF>)

Welding Technology, Certificate of Achievement

PROGRAM MAP HERE > (</CRC/MAIN/DOC/PROGRAMS/PROGRAM-MAPS/WELD-CERT-HO.PDF>)