

# YOSEMITE REGIONAL OCCUPATIONAL PROGRAM

## AG WELDING & FABRICATION

CBEDS Code: 4032

<u>JOB TITLES</u>	<u>DOT NO.</u>
Welder, Machine Operator	810.382-010
Metal Fabricator	619.361-014
Welder	819.384-010
Welder, Fitter	819.361-010

### **Course description:**

This course is designed to prepare students with fundamental skills, attitudes, & desires in welding and construction. The course will provide information on career requirements, including advanced education. The goal is to develop a sense of workmanship and pride and create a climate of student responsibility towards a job.

*Recommended Prerequisites:*

DURATION: Semesters/ 360 hours

CREDIT: Units

MEETS GRADUATION REQUIREMENTS IN:

REQUIRED FOR GRADUATION: No

SCHOOLS OFFERED:

MEETS UNIVERSITY OF CALIFORNIA ENTRANCE REQUIREMENTS: No

MEETS CALIFORNIA STATE UNIVERSITY REQUIREMENTS: No

ARTICULATED WITH POSTSECONDARY INSTITUTIONS: No

**Instructional Content**

Instruction will include:

**Student Outcomes**

At the end of instruction, the student will be able to:

**Hours**CL=Classroom  
CC=Comm. Class

<b>1. Shop &amp; Machine Safety</b> 1. Review tools & machinery used in class. 2. Review & demonstrate safe operation of tools & machinery. 3. Review shop procedures. 4. Administering oral & written safety tests. 5. Supervision of construction projects: a) Student b) School c) Department d) Community 6. Shop & machine maintenance	<b>Goal: The student will understand the importance of safety &amp; safe work practices, &amp; the names, functions, &amp; safe uses of tools &amp; machines.</b> A. Attain a passing mark in oral & written safety tests. B. Demonstrate safe operation of tools & machinery. C. Demonstrate an understanding of shop procedures. D. Demonstrate an understanding of the procedures, techniques, & processes used in welding & fabrication by attaining a passing mark in all assigned construction projects. E. Perform basic shop & machine maintenance.	<b>CTE</b> B1.0 B1.1 B1.2 B5.4 B8.1	<b>Anchor</b> A1.0 A2.0 A2.1 A2.2 A2.3  CR6, CR7 CR8	<b>CL</b> 15- 20	<b>CC</b> N/A
<b>2. Arc Welding (SMAW)</b> 1. Weld positions & procedures 2. Welding projects (positions) 3. Maintenance of equipment 4. Layout of mandatory project	<b>Goal: The student will understand the safe &amp; efficient use of oxyfuel processes &amp; equipment to form, separate, &amp; combine metals.</b> A. Identify procedures, techniques, & processes used in welding. B. Successfully complete all projects with a grade of "B" or better. C. Perform basis equipment maintenance. D. Demonstrate weld selection, equipment adjustments, & consumable selection by successfully completing mandatory project.	B8.0 B8.1 B8.2 B8.3 B8.4	A4.0 A4.1 A4.4 A4.5 A4.7 A5.0 A7.0 A7.4 A7.5 A7.7 CR1, CR4 CR5, CR6 CR9, CR10	20- 25	N/A
<b>3. Gas Welding (Oxyfuel)</b> 1. Weld positions & procedures 2. Welding projects (positions) 3. Maintenance of equipment 4. Layout of mandatory project	<b>Goal: The student will understand the safe &amp; efficient use of oxyfuel processes &amp; equipment to form, separate, &amp; combine metals.</b> A. Identify procedures, techniques, & processes used in welding & cutting. B. Successfully complete all projects with a grade of "B" or better. C. Perform basis equipment maintenance. D. Demonstrate weld selection, machine adjustments, & rod selection by successfully completing mandatory project.	B7.0 B7.1 B7.2 B7.3 B7.4 B7.5	CR1 CR4 R5 CR6 CR9 CR10	10- 15	N/A

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<b>Instructional Content</b>	<b>Student Outcomes</b>	<b>CTE</b>	<b>Anchor/CR</b>	<b>CL</b>	<b>CC</b>
<b>4. Gas Metal Arc Welding (GMAW)</b> 1. Theory of Mig 2. Weld positions & procedures 3. Welding projects (positions) 4. Maintenance of equipment 5. Layout of mandatory projec	<b>Goal: The student will understand the safe &amp; efficient use of oxyfuel processes &amp; equipment to form, separate, &amp; combine metals.</b> A. Understand theory of MIG B. Identify procedures, techniques, & processes used in welding. C. Successfully complete all projects with a grade of "B" or better. D. Perform basis equipment maintenance. E. Demonstrate weld selection, machine adjustments, & consumable selection by successfully completing mandatory project.	B8.0 – B8.4  B9.0 – B9.7	A4.0, A4.7, A5.0 – A5.4 A10.0, A10.3 A10.6, A10.8 A11.0 – A11.3  CR1, CR4, CR5, CR6, CR10	15-20	N/A
<b>5. TIG Welding</b> 1. Theory of TIG 2. Weld positions & procedures 3. Welding projects (positions) 4. Maintenance of equipment 5. Layout of mandatory project	<b>Goal: The student will understand the safe &amp; efficient use of oxyfuel processes &amp; equipment to form, separate, &amp; combine metals.</b> A. Understand theory of TIG B. Identify procedures, techniques, & processes used in welding. C. Successfully complete all projects with a grade of "B" or better. D. Perform basis equipment maintenance. E. Demonstrate weld selection, machine adjustments, & consumable selection by successfully completing mandatory project.	B8.0 – B8.4  B9.0 – B9.7	A4.0, A4.7, A5.0 – A5.4 A10.0, A10.3 A10.6, A10.8 A11.0 – A11.3  CR1, CR4, CR5, CR6, CR10	5-10	N/A
<b>6. Special Welding Processes.</b> 1. Plasma, Arc cutting/welding 2. Air carbon arc cutting 3. Hard facing 4. Tempering & annealing 5. Pipe & tube welding 6. Resistance 7. Theory of operation in specialty welding processes.	<b>Goal: The student will have a basic understanding of special processes for welding or cutting unusual materials, extremely thick materials, or very thin materials.</b> A. Identify special welding & cutting processes, & describe circumstances in which those processes are used. B. Explain the advantages & disadvantages of each. C. Have a basic understanding of the manner in which pipe & tubing joints and specialty materials are prepared & processes completed.	B8.0 – B8.4  B9.0 – B9.7	A4.0, A4.7, A5.0 – A5.4 A10.0, A10.3 A10.6, A10.8 A11.0 – A11.3  CR1, CR4, CR5, CR6, CR10	5-20	N/A

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<b>7. Weld Design.</b> 1. Metallurgy 2. Joint design 3. Stress & distortion 4. Jigs & fixtures 5. Weld testing & certification 6. Material selection 7. General alloys	<b>Goal: The student will have a basic understanding of weld design.</b> A. Understand the chemical, physical, & mechanical properties of welding materials & how welding processes affect these properties. B. Determine costs & select appropriate welding materials. C. Understand joint design. D. Use proper techniques to minimize effects of stress & distortion in welding. E. Demonstrate the ability to weld jigs & fixtures. F. Demonstrate an understanding of general alloys.	B9.0 B9.1 B9.2 B9.3 B9.4 B9.5 B9.6	R A10.0 A10.1 A10.2 A10.3  CR1 CR4	15-20	N/A
<b>8. Project Design/Blueprint Reading.</b> 1. Reading basic welding symbols. 2. Building a project using project plans. 3. General drafting symbols. 4. Use of 3 view drawings. 5. Creation of shop drawings. 6. Develop Bill of Materials. 7. Cut & order list. 8. Construction sequence.	<b>Goal: The student will understand the basic elements of proper product or project development &amp; documentation (including estimating, codes &amp; specification, sketching, material &amp; process selection, &amp; print reading) used in welding design.</b> A. Read & interpret prints to plan layout & produce welded product.	B9.4 B9.5  B12.2	A5.0 A5.2 A5.3 A10.0 A10.1  CR1 CR4	10-15	N/A
<b>9. Agricultural Equipment Construction/Repair.</b> 1. Construction techniques. 2. Equipment repair, maintenance, & upgrading (hard facing, special welding processes). 3. Equipment selection. 4. Metal forming & restoration. 5. Mathematical & geometrical formulas used in the field: - Right angles; - 45 degree angles; - Pythagorean Theorem; - Circumference of a circle; - Area of a circle. 6. Finish work	<b>Goal: The student will demonstrate an understanding of basic agricultural equipment construction &amp; repair techniques.</b> 1. Demonstrate an understanding of the theory of metal formation & movement. 2. Determine farm & shop needs for welding & other repair equipment. 3. Demonstrate an understanding of basic mathematical & geometrical concepts. 4. Be able to complete individual and/or small group projects.	   11.1  B10.1 B9.7 B6.3 B4.4 B2.4	A10.1 10.8 A9.2 A11.0 A11.1 A11.2  CR1 CR4 CR10	150-200	N/A

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<b>10. Supervised Agricultural</b>	<b>Goal: The student will understand the</b>	<b>CTE</b>	<b>Anchor/C</b>	<b>CL</b>	<b>CC</b>
<b>Experience Program - Recordkeeping - Leadership.</b> 1. Enterprise (project) development in the field of agriculture. 2. Participation in relevant organized youth activities (minimum of three for the school year). 3. Procedures for maintaining accurate enterprise project records. 4. Careers in welding and fabrication.	<b>organization of an enterprise &amp; understand the elements of production management.</b> A. Complete project record book. B. Incorporate enterprise project into students' portfolio. C. Growth will be demonstrated by diminishing instructor input. D. Students will be able to identify those skills needed for an entry level position in the welding/fabrication industry.	A1.2 A1.4 A1.6 A3.3 A4.2 A4.4 A4.4 A4.5	<b>R</b> A3.0 – A3.9 A4.3 A4.4 A4.7 A5.3 A5.4 A9.0 – A9.13  CR1-CR12	15- 20	N/A