

YOSEMITE REGIONAL OCCUPATIONAL PROGRAM

WELDING & FABRICATION

CBEDS Code: 4033

JOB TITLES

DOT NO.

Machine Helper	819.660-010
Metal Fabricator	619.361-014
Welder, Combination	819.384-010

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

<p>1. Shop & Machine Safety 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</p>	<p>Goal: The student will understand the importance of safety & safe work practices, & the names, functions, & safe uses of tools & machines. 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.</p>	<p>CTE</p>	<p>Anchor/ CR</p> <p>A1.0 A2.0-2.6 A6.1-6.8 A7.2 A7.3 A9.1-9.3 A10.1 A10.2 A11.1 A11.2</p> <p>CR1 CR5</p>	<p>CL 15-20</p>	<p>CC N/A</p>
<p>2. Arc Welding (SMAW) 1. Weld positions & procedures 2. Welding projects (positions) 3. Maintenance of equipment 4. Layout of mandatory project</p>	<p>Goal: The student will understand the safe & efficient use of oxyfuel processes & equipment to form, separate, & combine metals. 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.</p>	<p>C1.0 C2.1-2.4 C3.1-3.2 C4.0-4.3 C5.0-5.6 C8.0-8.3</p>	<p>A1.0 A2.3 A5.0-5.4 A6.4-6.6 A7.5 A10.0-10.4 A11.1 A11.5</p> <p>CR1 CR2 CR5 CR10 CR8</p>	<p>20-25</p>	<p>N/A</p>
<p>3. Gas Welding (Oxyfuel) 1. Weld positions & procedures 2. Welding projects (positions) 3. Maintenance of equipment 4. Layout of mandatory project</p>	<p>Goal: The student will understand the safe & efficient use of oxyfuel processes & equipment to form, separate, & combine metals. 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.</p>	<p>C1.0 C2.1-2.4 C3.1-3.2 C4.0-4.3 C5.0-5.6 C8.0-8.3</p>	<p>A1.0 A2.3 A5.0-5.4 A6.4-6.6 A7.5 A10.0-10.4 A11.1 A11.5</p> <p>CR1 CR2 CR5 CR10 CR8</p>	<p>10-15</p>	<p>N/A</p>

LEGEND:

A = ANCHOR

CR = CAREER READY

Instructional Content

Instruction will include:

Student Outcomes

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

HoursCL=Classroom
CC=Comm. Class

Instructional Content	Student Outcomes	CTE	ANCHOR/C R	CL	CC
4. Gas Metal Arc Welding (GMAW) 1. Theory of Mig 2. Weld positions & procedures 3. Welding projects (positions) 4. Maintenance of equipment 5. Layout of mandatory project	Goal: The student will understand the safe & efficient use of oxyfuel processes & equipment to form, separate, & combine metals. 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.	C1.0 C2.1-2.4 C3.1-3.2 C4.0-4.3 C5.0-5.6 C8.0-8.3	A1.0 A5.0 A5.1-5.3 A6.4-6.6 A7.5-7.6 A10.0- A10.4 A11.0 A11.5 CR1 CR2 CR5 CR10 CR8	15-20	N/A
5. TIG Welding 1. Theory of TIG 2. Weld positions & procedures 3. Welding projects (positions) 4. Maintenance of equipment 5. Layout of mandatory project	Goal: The student will understand the safe & efficient use of oxyfuel processes & equipment to form, separate, & combine metals. 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.	C1.0 C2.1-2.4 C3.1-3.2 C4.0-4.3 C5.0-5.6 C8.0-8.3	A1.0 A5.0 A5.1-5.3 A6.4-6.6 A7.5-7.6 A10.0- A10.4 A11.0 A11.5 CR1 CR2 CR5 CR10 CR8	5-10	N/A
6. Special Welding Processes. 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.	Goal: The student will have a basic understanding of special processes for welding or cutting unusual materials, extremely thick materials, or very thin materials. 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.	C1.0 C2.0-2.4 C3.2 C4.0-4.3 C5.1-5.4 C5.6 C6.1 C7.1 C7.5 C8.0-8.3	A1.0 A5.0 A5.1-5.3 A6.4-6.6 A7.5-7.6 A10.0- A10.4 A11.0 A11.5 CR1 CR2 CR5 CR10 CR8	5-20	N/A

Instructional Content

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7. Weld Design. 1. Metallurgy 2. Joint design 3. Stress & distortion 4. Jigs & fixtures 5. Weld testing & certification 6. Material selection 7. General alloys	Goal: The student will have a basic understanding of weld design. 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.	CTE C1.0 C2.0-2.4 C5.1-5.4 C6.1 C8.0-8.3	Anchor A1.0 A4.0-4.6 A5.0-5.4 A6.0-6.8 A8.1-8.3 A8.4 A10.1 A10.2 A10.4 A11.0-11.5	CL 15-20	CC N/A
8. Project Design/Blueprint Reading. 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.	Goal: The student will understand the basic elements of proper product or project development & documentation (including estimating, codes & specification, sketching, material & process selection, & print reading) used in welding design. A. Read & interpret prints to plan layout & produce welded product.	C1.0 C4.0-4.3	A1.0 A2.0-2.6 A4.0-4.6 A5.0-5.4 A6.7 A7.4 A7.7 A8.1-8.3 A9.2 A9.3 A9.7 CR1 CR1 CR10 CR9 CR12	10-15	N/A
9. Equipment Construction/Repair. 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	Goal: The student will demonstrate an understanding of basic agricultural equipment construction & repair techniques. 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.	C1.0 C2.1-2.4 C3.1-3.2 C4.0-4.3 C5.0-5.6 C8.0-8.3	A1.0 A2.2-2.6 A4.1-4.3 A5.0-5.4 A6.0-6.8 A7.3 A8.1 A9.2 A9.3 A9.7 A10.0-10.4 A11.3 A11.5 CR1 CR2 CR5 CR11	150-200	N/A