

Agricultural Welding & Metals Fabrication COURSE OUTLINE

1. Course Title: Agricultural Welding & Metals Fabrication

2. CBEDS Title: Welding: combination

3. CBEDS Number: 5616

4. Job Titles:

Arc Welder

Gas Welder

Combination Welder

Welder Assembler

Agricultural Structures

Agricultural Power & Machinery

Energy Delivery Systems

Farm & Ranch Equipment Manufactures

5. Course Description:

This competency-based course prepares students for entry-level positions in the Agriculture industry, specifically fabrication and welding. Students receive expanded experience in fabrication. Units of instruction are provided in gas welding, mig, braising, arc and gas cutting, and project layout. Also included is cost analysis, plan development and proper choice of materials. Teacher and self-designed projects will be used to assess student readiness needed in related occupations. Special emphasis for this class will be placed on work ethics, work quality and other job related skills. This course includes classroom instruction and lab work.

Student Outcomes and Objectives:

Students will:

1. Demonstrate an understanding of metal- fusion/demonstrate cooling distortion.
2. Recognize different methods of fabrication.
3. Demonstrate the process of pre-layout of a project.
4. Demonstrate the actual use of different modes of welding & cutting.
5. Demonstrate proper safety procedures necessary for a shop.
6. Understand the difference between metals and the proper selection of welding materials.
7. Understand/Demonstrate techniques used to develop quality projects.
8. Understand/Demonstrate common tools necessary to square/level projects.
9. Successfully produce projects that display different materials and designs.
10. Demonstrate bending, twisting, of decorative metals used in projects.
11. Develop necessary skills to successfully demonstrate orally and by written expression a presentation on course content.
12. Successfully fill out an employment application and resume.
13. Successful interviews for an oral/on staged, job interview, by oral expression.

Integrated throughout the course are career preparation standards, which include basic academic skills, communication, interpersonal skills, problem solving, workplace safety, technology, and employment literacy.

Pathway

Recommended Sequence	Courses
Introductory	Ag Science
Skill Building	Ag Mechanics
Advanced Skill	Ag. Welding & Metals Fabrication Supervised Agricultural Experience Project

6. Hours: *Students receive up to 180 hours of classroom instruction.*

7. Prerequisites: Ag Mechanics, Woodshop, Metal shop or by special arrangement by teacher.

8. Date (of creation/revision): July 2010

9. Course Outline

COURSE OUTLINE				
Upon successful completion of this course, students will be able to demonstrate the following skills necessary for entry-level employment.				
Instructional Units and Competencies	Course Hours	Model Curr. Standards	CA Academic Content Standards	CAHSEE
<p>I. CAREER PREPARATION STANDARDS</p> <p>A. Career Planning and Management</p> <ol style="list-style-type: none"> 1. Know the personal qualifications, interests, aptitudes, knowledge, and skills necessary to succeed in careers. <ol style="list-style-type: none"> a. Students will identify skills needed for job success. b. Students will identify the education and experience required for moving along a career ladder. 2. Understand the scope of career opportunities and know the requirements for education, training, and licensure. <ol style="list-style-type: none"> a. Students will describe how to find a job. b. Students will select two jobs in the field and map out a timeline for completing education and/or licensing requirements. c. Students will describe career opportunities in the welding and metal fabrication industry. 3. Develop a career plan that is designed to reflect career interests, pathways and postsecondary options. <ol style="list-style-type: none"> a. Students will conduct a self-assessment and explain how professional qualifications affect career choices. 4. Understand the role and function of professional organizations, industry associations, and organized labor in a productive society. <ol style="list-style-type: none"> a. Contact two professional organizations and identify the steps to become a member. 5. Understand the past, present and future trends that affect careers, such as technological developments and societal trends, and the resulting need for lifelong learning. <ol style="list-style-type: none"> a. Students will describe careers in welding and metal fabrication fields. b. Students will identify work-related cultural differences to prepare for a global marketplace. c. Students will relate the importance of the welding and metal fabrication industry to California agribusiness. 6. Know the main strategies for self-promotion in the hiring process, such as completing job applications, resume writing, interviewing skills, and preparing a portfolio. <ol style="list-style-type: none"> a. Students will write and key a resume, cover and thank you letters, and complete a job application. <p>B. Technology</p> <ol style="list-style-type: none"> 1. Understand past, present and future technological advances as they related to a chosen pathway. 2. Understand the use of technological resources to gain access to, manipulate, and produce information, products and services. <ol style="list-style-type: none"> a. Students will demonstrate the ability to complete simple tasks on the computer, including word processing. 3. Understand the influence of current and emerging technology on selected segments of the economy. 4. Use appropriate technology in the chosen career pathway. 	<p>10</p> <p>Additional hours are integrated throughout the course.</p>	<p>Agriculture & Natural Resources Industry Sector, Model Curriculum Standards</p> <p>3.0, 4.2, 4.6</p>	<p><u>Language Arts</u> (8) R 1.3, 2.6 W1.3, 2.5, LC 1.4,1.5 1.6 LS1.2, 1.3, (9/10) R2.1,2.3,2 W2.5 LC1.4 LS 1.1, 2.3 (11/12) R2.3 W2.5 LC1.2 <u>Math</u> (7) NS1.2, 1.7 MR 1.1,1.3 2.7,2.8, 3.1</p>	<p>Lang. Arts R 8.2.1 (9/10) R 2.1, 2.3 W2.5 Math (7) NS 1.2, 1.3, 1.7 MR 1.1, 2.1, 3.1</p>

<p>C. Problem Solving and Critical Thinking</p> <ol style="list-style-type: none"> 1. Apply appropriate problem-solving strategies and critical thinking to work-related issues and tasks. 2. Use critical thinking skills to make informed decisions and solve problems. <p>D. Health and Safety</p> <ol style="list-style-type: none"> 1. Know policies, procedures, and regulations, regarding health and safety in the workplace, including employers’ 2. Use tools and machines safely and appropriately. 3. Know how to both prevent and respond to accidents in the agriculture industry. <p>E. Responsibility and Flexibility</p> <ol style="list-style-type: none"> 1. Understand the qualities and behaviors that constitute a positive and professional work demeanor. 2. Understand the importance of accountability and responsibility in fulfilling personal, community, and work place roles. 3. Understand the need to adapt to varied roles and responsibilities. <p>F. Ethics and Legal Responsibilities</p> <ol style="list-style-type: none"> 1. Know the major local, district, state and federal regulatory agencies and entities that affect the industry and how they enforce laws and regulations. 2. Understand the concept and application of ethical and legal behavior consistent with workplace standards. <ol style="list-style-type: none"> a. Contact a business and obtain a copy of their rules for employment. b. Role play difference ethical scenarios. 3. Understand the role of personal integrity and ethical behavior in the workplace. <p>G. Leadership and Teamwork</p> <ol style="list-style-type: none"> 1. Understand the ways in which preprofessional associations such as the Future Farmers of America (FFA), and competitive career development activities enhance academic skills, promote career choices, and contribute to employability. 2. Understand leadership, cooperation, collaboration, and effective decision-making skills applied in group or team activities, including the student organization. <p>H. Technical Knowledge and Skills</p> <ol style="list-style-type: none"> 1. Understand the aims, purposes, history, and structure of the FFA student organization, and know the opportunities it makes available. 2. Understand the importance of maintaining and completing the California Agriculture Record Book. 				
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Course Outline

Instructional Units and Competencies	Hours	Model Curr. Standards.	CA Academic Standards	CAHSEE
Work Ethics- <ul style="list-style-type: none"> ◆ Job Readiness ◆ Clean up and Environmental regulations ◆ Tool placement & maintenance ◆ Attitude & Self Assessment 	5	Welding Technology Pathway Standards		
Shop Safety <ul style="list-style-type: none"> ◆ Prevention of accidents ◆ Identification of potential hazard ◆ Handling emergencies ◆ Safe and proper use of shop Tools ◆ Proper use of Eye protection and Back safety harness. 	10	Welding Technology Pathway Standards 6.0		
Chemical, Physical, and Mechanical Properties of Welding Materials and How Processes Affect Those Properties: <ul style="list-style-type: none"> ◆ Preparing weld joints for producing a product in accordance with print requirements and AWS standards. ◆ Utilizing proper fixtures and clamps to minimize undesirable defects as a result of the welding process. 	15	Welding Technology Pathway Standards D2.1 D2.2	S. 9-12; Physics; 3a.	
Safe and Efficient use of Processes Utilized in Welding Fabrication: <ul style="list-style-type: none"> ◆ Using a variety of measurement devices to layout a design. ◆ Using shears to cut flat metal plate material. ◆ Using saws to cut bar stock to size. ◆ Using drills to produce accurately located holes. ◆ Utilizes punch presses and benders for sheet metal fabrication. ◆ Identification of structural steel ◆ Use of Bill of Materials 	25	Welding Technology Pathway Standards D8.1 D8.2	ELA 9-10; Listening & Speaking; 1.1 & 1.6	
Students will Understand the Safe and Efficient Use of Tools and Equipment Used in Welding processes: <ul style="list-style-type: none"> ◆ Flame cutting a steel plate producing a straight, slag free edge. ◆ Brazing a cast iron part-requiring repair. ◆ Grinding. ◆ Welding steel parts in accordance with specification in all positions, utilizing proper gas settings, tip sizes and filler rod. 	25	Welding Technology Pathway Standards D2.0		
Functions of Shielded Metal Arc Welding (SMAW) <ul style="list-style-type: none"> ◆ Welding Equipment and Safety ◆ Striking and Maintaining an Arc ◆ American Welding Society (AWS) Classification System for Electrodes ◆ Four Basic Weld Joints ◆ Controlling Distortion in Arc Welding ◆ Weld Testing ◆ Welding steel parts in accordance with specification in all positions, utilizing proper gas settings, tip sizes and filler rod. ◆ Identifying welding rod codes according to AWS standards for the given application. 	50	Welding Technology Pathway Standards D3.2 D3.3	S. 9-12; Physics; 5b M. 9-12; Algebra: 3 & 4	

