

## Ag Fabrications and Welding Course Outline

### Phase I –Ag Fabrications = 360 Hours and Phase II - Welding = 360 Hours

*Aligned with CTE Model Curriculum Standards: Manufacturing and Product Development Industry Sector – A) Graphic Arts Technology, B) Integrated Graphics Technology C) Machine and Forming Technology, D) Welding Technology*

Major Units of Instruction Foundation and Pathway Standards Aligned Ag/Nat Resources: Ag Mech Pathway (B) and Welding Manufacturing/Product Dev: Welding Pathway (D)	Expected Student Learning Results (ESLRs)	Assessment & Materials	Class Hours	Academic Standards Reinforced
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### PHASE I (Ag Fabrications)

<b>1. ORIENTATION AND SHOP SAFETY B1.0</b> a. Shop rules b. Use of safety glasses c. Physical orientation d. Basic equipment needs and uses e. Safety tests	Responsible Individuals Interpersonal Learners Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	15	
<b>2. MEASUREMENT/DRAWING D1.1, D1.2</b> a. Basic math skills review and practice b. Math concept related to computing material needs, estimating costs, etc. c. Feet and inches, scales, areas, volume d. Sketches and sketching e. Scale drawings f. Complicated and simple plans g. Blue print reading using scale-interpret	Effective Communicators Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	45	Math 1.1 Geom: 8.0 10.0 11.0 12.0
<b>3. THE ARC WELDING PROCESS D2.2, D3.3, D6.0, D5.0, D4.0, D7.1, D8.0, B3.1, B8.0, B9.3, B9.2</b> a. Fundamental steps and principles i. Heat control (amperage) ii. Speed of travel iii. Angle of electrode iv. Length of arc b. Types of welders, equipment and selection i. AC ii. DC iii. Accessories c. Rod selection (AWS classification) d. Running welds in all positions i. Butt ii. Tee fillet iii. Lap iv. Vee butt e. Specialized arc welding equipment i. Metal identification and joints ii. Gas Metal Arc Welding (GMAW) iii. Gas Tungsten Arc Welding (GTAW)	Effective Communicators Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	180	
<b>4. THE OXY-ACETYLENE PROCESS D8.0, B7.0</b> a. Safety b. Equipment and accessories i. Acetylene tanks, regulators ii. Oxygen tanks, regulators iii. Hoses, torches, tips iv. Track burners	Responsible Individuals Effective Communicators Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	30	

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c. Setting up and adjusting equipment i. Setting up and safety check ii. Lighting and adjusting torch iii. Shut down and secure equipment				
<b>5. WELDING PROJECTS D4.2, B9.4, B9.5, B9.6, B9.7</b> a. Preparation b. Layout c. Finishing	Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	75	
<b>6. ESSENTIAL EMPLOYABILITY SKILLS/CAREER PREPARATION STANDARDS</b> a. Understand how personal skill development effect employability (positive attitude, honesty, self-confidence, time management). 8.3 b. Understand principles of effective interpersonal skills (group dynamics, conflict resolution, negotiations). 9.0 all c. Understand the importance of good academic skills, critical thinking and problem-solving in the workplace. 1.0, 5.0 d. Understand principles of effective communication. 2.0 e. Understand occupational safety issues and observe all safety rules. 6.0 f. Understand career awareness, paths and strategies for obtaining employment. 3.0 g. Understand and adapt to changing technology. 4.0 h. Understand and prepare for employment (resume, job application, job interview, portfolio development). 3.6	Responsible Individuals Effective Communicators	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	15	Language Arts (8) R 1.3, 2.6 W1.3, 2.5. LC 1.4,1.5, 1.6 LS1.2, 1.3, 1.7 (9/10) R2.1,2.3,2.6; W2.5; LC1.4; LS 1.1, 2.3 (11/12) R2.3; W2.5; LC1.2  Math (7)  NS1.2, 1.3, 1.7 MR 1.1,1.3,2.1, 2.7,2.8, 3.1 <u>CAHSEE</u> 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
<b>7. METHOD OF EVALUATION</b> Student has successfully completed the ¼" Plate Bend Test in the following positions: a. Flat b. Horizontal c. Overhead d. Vertical	Responsible Individuals Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects		
<b>TOTAL HOURS</b>			<b>360</b>	

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Major Units of Instruction	Expected Student Learning Results (ESLRs)	Assessment & Materials	Class Hours	Academic Standards Reinforced
Foundation and Pathway Standards Aligned Ag/Nat Resources: Ag Mech Pathway (B) and Welding Manufacturing/Product Dev: Welding Pathway (D)				

### PHASE II (Welding)

1. <b>SHOP SAFETY</b> <i>D9.3</i> a. Personal safety equipment b. Safety of hand and power tools c. Safety test	Responsible Individuals Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	10	
2. <b>OXY-ACETYLENE CUTTING</b> <i>D6.2, D8.1</i> a. Hand b. Machine i. In-line beveler ii. Pipe beveler	Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	30	
3. <b>ARC WELDING (SMAW)</b> <i>D5.1, D5.2, D5.3, D7.1, D7.4, D7.5, D8.1, D8.2</i> a. ¼" Single Vee 60° including 100% penetration i. Electrodes: 6010/7018 b. Test: FACE and Root Bend c. ½" Single Vee 60° including 100% penetration i. Electrodes: 6010/7018 d. Test: FACE and Root 4pc e. ½" Double Vee 60° including 100% penetration i. Electrodes: 6010/7018 ii. Test: FACE and Root Bend 4pc f. 1" Single Vee 60° included i. ¼" x 1½" x 8" FB Back up Strip g. Test: Side Bend 4pc	Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	25 25 25 40	
4. <b>PIPE</b> <i>D5.1, D5.2, D5.3, D7.1, D7.3, D7.4, D7.5, D8.1, D8.2</i> a. 6"-10", 30°-60° included b. Root opening c. Root Pass 6010 100% penetration d. Fill Pass: 6010/7010 e. Cap Pass: 6010/7010/7018 f. Position: 2G, 5G, 6G g. Test: Visual, FACE and Root Bend	Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	135	
5. <b>PROJECT CONSTRUCTION</b> <i>D1.0, D1.3, D2.1, D2.2, D3.2, D3.3, D4.1, D4.2, D6.1, D6.2, D7.3, D7.4, D7.5, D8.2, D9.1, D9.2</i>	Responsible Citizen Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes - Practice - Projects	20	
6. <b>MIG</b> <i>D3.3, D7.1, D7.4, D7.5, D8.1, D8.2</i> a. Setup b. Amp/wire synchronized	Technological Producers Problem Solvers	- Lecture - Demonstration - Tests and quizzes	45	

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<ul style="list-style-type: none"> <li>c. Gasses</li> <li>d. Thin to thin</li> <li>e. Thick to thick with joint prep</li> <li>f. Thin to thick</li> <li>g. Pipe to plate</li> </ul>		<ul style="list-style-type: none"> <li>- Practice</li> <li>- Projects</li> </ul>		
<p><b>7. ESSENTIAL EMPLOYABILITY SKILLS/CAREER PREPARATION STANDARDS</b></p> <ul style="list-style-type: none"> <li>a. Understand how personal skill development affects employability (positive attitude, honesty, self-confidence, time management). 8.3</li> <li>b. Understand principles of effective interpersonal skills (group dynamics, conflict resolution, negotiations). 9.0all</li> <li>c. Understand the importance of good academic skills, critical thinking and problem-solving in the workplace. 1.0, 5.0</li> <li>d. Understand principles of effective communication. 2.0</li> <li>e. Understand occupational safety issues and observe all safety rules. 6.0</li> <li>f. Understand career awareness, paths and strategies for obtaining employment. 3.0all</li> <li>g. Understand and adapt to changing technology. 4.0</li> <li>h. Understand and prepare for employment (resume, job application, job interview, portfolio development). 3.6</li> </ul>	Responsible Individuals Effective Communicators Interpersonal Learners	<ul style="list-style-type: none"> <li>- Lecture</li> <li>- Demonstration</li> <li>- Tests and quizzes</li> <li>- Practice</li> <li>- Projects</li> </ul>	5	Language Arts (8) R 1.3, 2.6 W1.3, 2.5. LC 1.4,1.5, 1.6 LS1.2, 1.3, 1.7 (9/10) R2.1,2.3,2.6; W2.5; LC1.4; LS 1.1, 2.3 (11/12) R2.3; W2.5; LC1.2  Math (7)  NS1.2, 1.3, 1.7 MR 1.1,1.3,2.1, 2.7,2.8, 3.1 <u>CAHSEE</u> 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><b>8. METHOD OF EVALUATION</b></p> Student has successfully completed the 1" Bend Test in the following positions: <ul style="list-style-type: none"> <li>a. Flat</li> <li>b. Horizontal</li> <li>c. Overhead</li> <li>d. Vertical</li> </ul>	Technological Producers Problem Solvers	<ul style="list-style-type: none"> <li>- Lecture</li> <li>- Demonstration</li> <li>- Tests and quizzes</li> <li>- Practice</li> <li>- Projects</li> </ul>		
<b>TOTAL HOURS</b>			<b>360</b>	