MISSION TRAILS REGIONAL OCCUPATIONAL PROGRAM

1. COURSE TITLE: Agricultural Mechanics

2. CBEDS TITLE: Agriculture: Mechanics and Engineering Technology

3. CBEDS NUMBER: 4030

4. JOB TITLES:

Maintenance Technician	638.281-026
Electronic Helper	829.887-014
Equipment Installer	829.381-022
Metal Fabricator	619.380-022
Machine Operator	619.885-070
Tack Welder	810.884-038
Welder Fitter	819.381-022
Fit Up Man	819.781-010
Hand Flame Cutter	816.884-014
Welder Apprentice	812.884-010
Repair Welder	812.884-022
Welding Machine Operator	810.782-026

5. COURSE DESCRIPTION:
Students will learn how to read blueprints, interpret welding symbols, cut metal and weld metal. Welding training is offered in: Shielded Metal Arc Welding (Stick), Mig, TIG, and Oxy/Gas. Metal cutting training includes Oxy/Gas and Plasma Arc cutting.

6. HOURS: 180

7. PREREQUISITES:

8. REVISION DATE: January 13, 2009

9. COURSE OUTLINE:

a. CONTENT AREA SKILLS:

Instruction will include:	Student will be able to:	CL	CC	CP
1. Safety Some of these issues are learned concurrently along with technical skill subject areas.	• Identify safety hazards • Properly use firefighting equipment • Identify class of fire and types of fire extinguishers • Practice basic shop safety Practice welding, power tool and hand tool safety • Describe safety lock down procedures used in industry • Use the materials Safety Data Sheets (MSDS) • Use personal protective equipment and clothing.	5		
2. Measure & Layout	• Read a ruler to the $1/16^{th}$ of an inch • Use a decimal equivalency table • Identify various measuring and layout tools • Interpret the meaning of the different lines in a simple working drawing • Make a simple scale drawing to determine material requirements joint angles and length of diagonals for a proposed project • Use dividers and calipers • Measure sheet metal using a standard wire gauge • Measure an angle using a protractor • Use bluing to mark sheet metal • Use chalk and scribe to mark sheet metal for cutting • Interpret blueprint symbols, cutting planes and views	10		
3. Perform metal work	• Identify metal working hand tools • Cut metal using the hacksaw, cold chisel and file • Bend sheet metal using a hand brake • Bend steel cold • Heat and bend steel • Shape metal using power grinding equipment • Drill holes using the drill press and hand drill • Cut metal using the metal cutting band saw • Cut sheet metal with the tin snips	10		

	• Cut metal using the iron worker • Heat-treat metal			
4. Metallurgy	• Identify types of welding joints • List steel shapes available in the metal industry • Read a pipe schedule • Use warpage control techniques in welding • List five welding processes • Know changes in the steel when heated and cooled	10		
5.Paint	• Use sand blasting equipment to remove paint and rust • Clean and prepare weld joints for painting • Apply primer and paint by hand • Spray paint with a spray gun	10		
Welding Processes				
1. Oxyacetylene Welding	• Setup oxy-acetylene welding equipment • Light and adjust the flame to Neutral flame • Weld steel in the flat, vertical, horizontal and overhead position • Braze weld mild steel • Apply hard facing material to thin metals • Braze weld cast iron	30		
2. Oxyacetylene Cutting	• Setup oxy-acetylene cutting equipment • Cut metals using the Oxyacetylene cutting equipment • Make straight cuts on steel • Make bevel cuts on plate steel • Cut holes on steel • Cut and notch steel for assembly by welding	15		
3. Shielded Metal Arc Welding (SMAW)	• Setup MSAW welding machine for welding • Know arc-welding safety • Weld in the flat, horizontal, vertical positions • Weld corner, Butt, Lap, Tee and Edge Joints • Know welding rod classifications • Use hard face welding rods • Weld stainless steel • Weld cast iron • Weld standing on a ladder • Weld in the overhead position	35		
4. Gas Metal Arc (MIG)	• Setup MIG • Welding equipment • Adjust the machine for welding • Weld stainless steel	20		

	• Weld in the flat horizontal, vertical positions • Perform out of position welding			
5. Gas Tungsten Arc Welding (TIG)	• Setup TIG welding equipment • Adjust the machine for welding • Weld steel • Weld stainless steel • Welding aluminum	25		
6. Plasma Cutting	• Setup Plasma Cutting equipment for operation • Adjust equipment for cutting • Cut mild steel • Cut aluminum • Cut copper	5		
7. Carbon Arc Cutting	• Setup Carbon Arc equipment • Adjust welding machine for Carbon Arc • Remove welds • Gut grooves on steel • Cut steel	5		

9. COURSE OUTLINE:

b.) CAREER PERFORMANCE STANDARDS

i. EXPECTED STUDENT OUTCOMES

ii. HOURS OF INSTRUCTION

CAREER PERFORMANCE STANDARDS	EXPECTED STUDENT OUTCOMES	HOURS
Instruction will include:	Student will be able to:	
1. Personal Skills ▪ Classroom policies & procedures ▪ Ethics → Work → Business ▪ Sexual harassment laws ▪ Personal skills, including positive attitude, self-confident, honesty, perseverance & self-discipline ▪ Professional appearance ▪ Time management ▪ Lifelong learning	1. Understand how personal skill development, including positive attitude, honesty, self-confidence, time management, & other positive traits affect employability. ▪ Demonstrate and understand classroom policies & procedures ▪ Define work and business ethics & demonstrate the importance of ethical standards & social responsibilities in the business environment. ▪ Discuss the laws applicable to sexual harassment & discuss tactics for handling harassment situations. ▪ Demonstrate personal skills in class and/or business environment: → Positive attitude → Self-confidence → Honesty → Perseverance → Self-discipline ▪ Demonstrate and model personal hygiene and acceptable professional attire ▪ Prioritize tasks and meet deadlines ▪ Explain the importance of lifelong learning	Integrated in content area skills
2. Interpersonal Skills ▪ Group dynamics ▪ Conflict resolution and negotiation ▪ Team work ▪ Etiquette across gender and cultural groups	2. Understand principles of effective interpersonal skills, including group dynamics, conflict resolution, and negotiation. ▪ Identify and explain the key concepts of group dynamics ▪ Discuss and demonstrate the dynamics of conflict resolution and negotiation, and their importance within the business environment ▪ Demonstrate effective teamwork, share responsibilities, accept supervision and assume leadership roles ▪ Demonstrate cooperative working relationships and proper etiquette across gender and cultural groups	Integrated in content area skills

3. Thinking and Problem-Solving Skills ▪ Critical and creative thinking skills ▪ Logical reasoning and problem-solving skills ▪ Numerical estimation, measurement, and calculation ▪ Identify, locate, and organize needed information and propose, evaluate, and select alternative solutions	3. Understand the importance of critical thinking and problem-solving skills in the workplace. ▪ Apply critical and creative thinking skills in a work environment and implement a plan of improvement as needed ▪ Demonstrate logical reasoning and problem solving skills in a work environment ▪ Apply numerical estimation, measurement and calculation skills to business applications including the following: → Whole number math → Decimals & fractions → Counting & monetary functions → Use of tables & graphs ▪ Recognize problem situations; identify, locate and organize needed information, and propose, evaluate and select from alternate solutions	Integrated in content area skills
4. Communication Skills ▪ Written communications ▪ Verbal and Nonverbal communications ▪ Active and effective listening ▪ Proper etiquette in business communications ▪ Writing and editing skills ▪ Use of reference material and handbooks ▪ Oral presentations	4. Understand principles of effective communication. ▪ Read and implement written instructions, technical manuals, written communication, and reference books ▪ Present a positive image of verbal and nonverbal communication through use of appropriate methods ▪ Demonstrate active and effective listening skills through verbal, nonverbal and written feedback ▪ Demonstrate proper etiquette in business communications, including an awareness of requisite for international communications (languages, customs, and time zones) ▪ Demonstrate the following writing and editing skills: → Use correct grammar, punctuation, capitalization, vocabulary and spelling → Write, proofread and edit → Select and use appropriate forms of communication ▪ Exhibit a proficiency in the use of reference materials such as dictionary, thesaurus, telephone directory, almanac, zip code directory, and office handbooks ▪	Integrated in content area skills
5. Occupational Safety ▪ Good safety practices	5. Understand occupational safety issues, including avoidance of physical hazards ▪ Model and implement good safety practices including: → Avoidance and reporting of physical hazards in the work environment → Safe operation of equipment → Proper handling of hazardous materials	Integrated in content area skills

6. Employment Literacy ▪ Expand awareness of career opportunities ▪ Set employment goals and objectives ▪ Aptitudes, personal characteristics and interests ▪ Develop portfolio to C-TAP standards ▪ Develop interviewing techniques	6. Understand career paths and strategies for obtaining employment. ▪ Explore career opportunities and develop a career plan ▪ Identify steps for setting goals and writing personal goals and objectives ▪ Examine aptitudes related to career options; relate personal characteristics and interests to educational and occupational opportunities ▪ Develop a portfolio to include the following: → Letter of Introduction → Cover letter → Resume → Thank you letter → Job application → Licenses, Certificates and Awards → Transcripts → Letters of Recommendation → Work Samples	Integrated in content area skills
7. Technology Literacy ▪ Apply Industry specific technology ▪ Use Industry specific software ▪ Demonstrate Keyboarding ▪ Accessing information ▪ Lifelong enhancement of technology skills	7. Understand and adapt to changing technology. ▪ Identify and demonstrate use of appropriate technology ▪ Identify and use industry specific software ▪ Demonstrate proficiency in alphanumeric keyboarding ▪ Input and retrieve information ▪ Understand the importance of lifelong learning in adapting to changing technology	Integrated in content area skills

ADDITIONAL RECOMMENDED /OPTIONAL ITEMS

a. ARTICULATION: YES (HARTNELL COLLEGE)

b. VOCATIONAL CREDIT: 10 Credits

c. ACADEMIC CREDIT: Vocational Credits/Elective Credits

d. INSTRUCTIONAL STRATEGIES: Lecture, Demonstration, Hands-on Application, Group Work, Community Classroom

e. INSTRUCTIONAL MATERIALS: Basic Hand Tools, Technical Manuals, Diagnostic Tools, Multi-media, Live Demonstration of Tractors, Text Book (English & Spanish), Video Tapes, Computer welding software, Mig, Tig, Smaw, Oxy/gas, Spot Welding machines, Plasma and Oxy/Gas cutting equipment and other iron working equipment.

f. CERTIFICATES: Available upon completion of course or completion of a semester.