

**Agriculture, Food & Natural Resources Career Cluster  
Agricultural Metals Fabrication  
Course Number 01.42400**

**Course Description**

This course is designed to provide students with a more in-depth study of agricultural metal fabrication. Students interested in agricultural mechanics will have the opportunity to explore the many career possibilities in the field of agricultural metal fabrication. Additionally, hands-on-laboratory activities enhance the classroom learning experience and provide students with the skills needed to participate in Supervised Agricultural Experience Programs and FFA Career Development Events.

**Course Standard 1**

**AFNR-AMF-1**

The following standard is included in all CTAE courses adopted for the Career Cluster/Pathways. Teachers should incorporate the elements of this standard into lesson plans during the course. The topics listed for each element of the standard may be addressed in differentiated instruction matching the content of each course. These elements may also be addressed with specific lessons from a variety of resources. This content is not to be treated as a unit or separate body of knowledge but rather integrated into class activities as applications of the concept.

**Standard: Demonstrate employability skills required by business and industry.**

The following elements should be integrated throughout the content of this course.

**1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.**

Person-to-Person Etiquette	Telephone and Email Etiquette	Cell Phone and Internet Etiquette	Communicating At Work	Listening
Interacting with Your Boss	Telephone Conversations	Using Blogs	Improving Communication Skills	Reasons, Benefits, and Barriers
Interacting with Subordinates	Barriers to Phone conversations	Using Social Media	Effective Oral Communication	Listening Strategies
Interacting with Co-workers	Making and Returning Calls		Effective Written Communication	Ways We Filter What We Hear
Interacting with Suppliers	Making Cold Calls		Effective Nonverbal Skills	Developing a Listening Attitude
	Handling Conference Calls		Effective Word Use	Show You Are Listening
	Handling Unsolicited Calls		Giving and Receiving Feedback	Asking Questions
				Obtaining Feedback
				Getting Others to Listen

Nonverbal Communication	Written Communication	Speaking	Applications and Effective Résumés
Communicating Nonverbally	Writing Documents	Using Language Carefully	Completing a Job Application
Reading Body Language and mixed Messages	Constructive Criticism in Writing	One-on-One Conversations	Writing a Cover Letter
Matching Verbal and Nonverbal communication		Small Group Communication	Things to Include in a Résumé
Improving Nonverbal Indicators		Large Group Communication	Selling Yourself in a Résumé
Nonverbal Feedback		Making Speeches	Terms to Use in a Résumé

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Showing Confidence Nonverbally		Involving the Audience	Describing Your Job Strengths
Showing Assertiveness		Answering Questions	Organizing Your Résumé
		Visual and Media Aids	Writing an Electronic Résumé
		Errors in Presentation	Dressing Up Your Résumé

### 1.2 Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.

Teamwork and Problem Solving	Meeting Etiquette
Thinking Creatively	Preparation and Participation in Meetings
Taking Risks	Conducting Two-Person or Large Group Meetings
Building Team Communication	Inviting and Introducing Speakers
	Facilitating Discussions and Closing
	Preparing Visual Aids
	Virtual Meetings

### 1.3 Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

Problem Solving	Customer Service	The Application Process	Interviewing Skills	Finding the Right Job
Transferable Job Skills	Gaining Trust and Interacting with Customers	Providing Information, Accuracy and Double Checking	Preparing for an Interview	Locating Jobs and Networking
Becoming a Problem Solver	Learning and Giving Customers What They Want	Online Application Process	Questions to Ask in an Interview	Job Shopping Online
Identifying a Problem	Keeping Customers Coming Back	Following Up After Submitting an Application	Things to Include in a Career Portfolio	Job Search Websites
Becoming a Critical Thinker	Seeing the Customer's Point	Effective Résumés:	Traits Employers are Seeking	Participation in Job Fairs
Managing	Selling Yourself and the Company	Matching Your Talents to a Job	Considerations Before Taking a Job	Searching the Classified Ads
	Handling Customer Complaints	When a Résumé Should be Used		Using Employment Agencies
	Strategies for Customer Service			Landing an Internship
				Staying Motivated to Search

### 1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.

Workplace Ethics	Personal Characteristics	Employer Expectations	Business Etiquette	Communicating at Work
Demonstrating Good Work Ethic	Demonstrating a Good Attitude	Behaviors Employers Expect	Language and Behavior	Handling Anger
Behaving Appropriately	Gaining and Showing Respect	Objectionable Behaviors	Keeping Information Confidential	Dealing with Difficult Coworkers
Maintaining Honesty	Demonstrating Responsibility	Establishing Credibility	Avoiding Gossip	Dealing with a Difficult Boss
Playing Fair	Showing Dependability	Demonstrating Your Skills	Appropriate Work Email	Dealing with Difficult Customers
Using Ethical Language	Being Courteous	Building Work Relationships	Cell Phone Etiquette	Dealing with Conflict

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Showing Responsibility	Gaining Coworkers' Trust		Appropriate Work Texting	
Reducing Harassment	Persevering		Understanding Copyright	
Respecting Diversity	Handling Criticism		Social Networking	
Making Truthfulness a Habit	Showing Professionalism			
Leaving a Job Ethically				

### 1.5 Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply team work skills.

Expected Work Traits	Teamwork	Time Management
Demonstrating Responsibility	Teamwork Skills	Managing Time
Dealing with Information Overload	Reasons Companies Use Teams	Putting First Things First
Transferable Job Skills	Decisions Teams Make	Juggling Many Priorities
Managing Change	Team Responsibilities	Overcoming Procrastination
Adopting a New Technology	Problems That Affect Teams	Organizing Workspace and Tasks
	Expressing Yourself on a Team	Staying Organized
	Giving and Receiving Constructive Criticism	Finding More Time
		Managing Projects
		Prioritizing Personal and Work Life

### 1.6 Present a professional image through appearance, behavior and language.

On-the-Job Etiquette	Person-to-Person Etiquette	Communication Etiquette	Presenting Yourself
Using Professional Manners	Meeting Business Acquaintances	Creating a Good Impression	Looking Professional
Introducing People	Meeting People for the First Time	Keeping Phone Calls Professional	Dressing for Success
Appropriate Dress	Showing Politeness	Proper Use of Work Email	Showing a Professional Attitude
Business Meal Functions		Proper Use of Cell Phone	Using Good Posture
Behavior at Work Parties		Proper Use in Texting	Presenting Yourself to Associates
Behavior at Conventions			Accepting Criticism
International Etiquette			Demonstrating Leadership
Cross-Cultural Etiquette			
Working in a Cubicle			

### Support of CTAE Foundation Course Standards and Georgia Performance Standards L9-10RST 1-10 and L9-10WHST 1-10:

Georgia Standards of Excellence ELA/Literacy standards have been written specifically for technical subjects and have been adopted as part of the official standards for all CTAE courses.

## Course Standard 2

### AFNR-AMF-2

**Orient and apply the comprehensive program of agricultural education, learn to work safely in the agriculture lab and work sites, demonstrate selected competencies in leadership through the FFA and agricultural industry organizations, and develop plans for a Supervised Agricultural Experience Program (SAEP).**

- 2.1 Explain the role of the Agriculture Education program and the FFA in personal development.
- 2.2 Demonstrate knowledge learned through a SAEP.
- 2.3 Designs, implements, and documents SAE by recording steps, skills acquired, and financial information.
- 2.4 Develop leadership and personal development skills through participation in the FFA.
- 2.5 Explore the history and background of the FFA.

## Course Standard 3

### AFNR-AMF-3

**Identify careers in the agricultural mechanics industry in the areas of agricultural construction, agricultural electrical systems, welding and metal fabrication, and agriculture power machinery.**

- 3.1 Explore career opportunities in Agricultural Mechanics through the FFA and Agriculture Education Program.
- 3.2 Explore the professional organizations associated with agricultural mechanics skills and related occupations.
- 3.3 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.
- 3.4 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.
- 3.5 Exhibit critical thinking and problem solving skills to locate, analyze, and apply information in career planning and employment situations related to agricultural mechanics.
- 3.6 Apply the appropriate skill sets to be productive in a changing, technological, and diverse workplace to be able to work independently, interpret data, and apply team work skills.

## Course Standard 4

### AFNR-AMF-4

**Demonstrate Metal Fabrication Safety by recognizing, identifying, and describing factors that affect the lab and work environment and be able to determine the proper procedures for correcting safety hazards.**

- 4.1 Identify and eliminate potential hazards in the agricultural mechanics laboratory and/or work setting.
- 4.2 Discuss the importance of safety in agricultural occupations.
- 4.3 Describe a safe agricultural work environment.
- 4.4 Select safety equipment and procedures for various agriculture related activities.
- 4.5 Demonstrate safety procedures and appropriate behavior while working in the agriculture classroom, labs, and/or work sites.
- 4.6 Distinguish the areas identified by various safety colors and the importance of the coding.
- 4.7 Describe the meaning of each safety color.
- 4.8 Identify and describe personal protective equipment required for various activities conducted in the agricultural mechanics laboratory and industry.
- 4.9 Recognize potential hazards related to working with electricity, electric arc welders, hand tools, portable and stationary power equipment, power machinery, fasteners and fuels, lubricants, solvents, paints and other chemicals used in agricultural mechanics.
- 4.10 Safely operate all hand tools, power tools, and equipment in the agricultural mechanics laboratory.

## Course Standard 5

### AFNR-AMF-5

**Explain the process of gas metal arc welding, describe types of welded joints and weld positions, select metals for use in the construction of agricultural structures and equipment, select electrodes for various metals and weld applications, demonstrate the ability to select the proper welding voltage and wire speed for various metal thicknesses and joint types and demonstrate skills necessary to prepare metals and weld joints with the gas metal arc welding process.**

- 5.1 Describe the Gas Metal Arc Welding (GMAW) process.
- 5.2 Select shielding gasses for use in GMAW.
- 5.3 Identify the parts of GMAW equipment.
- 5.4 Select wire speed and voltage for welding with the GMAW process based on wire type, wire diameter, shielding gas and the equipment manufacturer's recommendation.

## Course Standard 6

### AFNR-AMF-6

**Define shielded metal arc welding, describe types of welded joints and weld positions, select metals for use in the construction of agricultural structures and equipment, select electrodes for various metals and weld applications, demonstrate the ability to select the proper welding amperage for various metal thicknesses and joint types and demonstrate skills necessary to prepare metals and weld joints with the shielded arc welding process.**

- 6.1 Define terms associated with shielded metal arc welding.
- 6.2 Describe the parts of an arc welder.
- 6.3 Compare alternating current, direct current and transformer rectifier welders and list advantages and disadvantages for each.
- 6.4 Compare the direct current electrode negative and direct current electrode positive welding processes and explain the application of each.
- 6.5 Select electrodes based upon type of metal to be welded, material thickness, and weld position.
- 6.6 Select amperage and adjust welders for optimum weld performance.
- 6.7 Demonstrate proper welding techniques for various welded joints and weld positions.
- 6.8 Identify metal fabrication equipment and demonstrate the ability to set-up, adjust and use metal fabrication equipment to cut, shear, punch, break and bend metal.
- 6.9 Identify metals and alloys used in metal fabrication based on their metallurgical properties.

## Course Standard 7

### AFNR-AMF-7

**Demonstrate the proper set-up and use of the oxy-fuel welding and cutting outfit for cutting steel and welding various material thicknesses and joint types.**

- 7.1 Describe the parts of an oxy-fuel welding and cutting outfit including parts of the regulator, torch body, hose fittings, welding tips, and cutting attachments.
- 7.2 Describe the role of oxygen in the welding and cutting process.
- 7.3 Describe the role of fuels in the welding and cutting process.
- 7.4 Compare different fuels used with oxygen in oxy/fuel welding and cutting.
- 7.5 Demonstrate the safe set-up and shut down procedures for using the oxy/acetylene welding and cutting outfit.
- 7.6 Perform welding and cutting operations to industry standards.

## Course Standard 8

### AFNR-AMF-8

**Analyze and identify metal based on its characteristics in order to determine the correct process and usage of different types of metals and various alloys.**

- 8.1 Identify and explain the different types of metals and alloys used in the welding industry.
- 8.2 Identify and implement the proper processes used in welding various types of metals and/or alloys.
- 8.3 Compare sizes and prices of metal for purchase to demonstrate the economics of the metal fabrication industry.
- 8.4 Employ various processes needed to weld and/or bond various alloys and different types of metals.

## Course Standard 9

### AFNR-AMF-9

**Plan, design, draw, construct, and preserve a metalworking project.**

- 9.1 Create metalworking project using simple drawing techniques.
- 9.2 State the use, format, and calculate a bill of materials.
- 9.3 Select and plan projects that develop metalworking skills with hand tools while demonstrating the proper and safe use of these hand tools according to standards that the instructor has given.
- 9.4 Prepare metal projects for finishing by selecting and using appropriate materials for sanding with appropriate materials, selecting and use of paint, varnish, and stains.