

**Architecture and Construction Career Cluster
Introduction to Metals
Course Number 48.58100**

Course Description:

The metals technology curriculum, Introduction to Metals, is designed to acquaint students with the three major technical occupations (welding, sheet metal, and machining). The various activities equip high school students with the skills needed to select a metal industry occupation, enter the work force, and continue to advance in one of these specialized metals occupations. Experiences include an introduction to the basic requirements of each of these fields, exposure to the structure and nature of career opportunities, and an introduction to types of training and skills required and the use of specialized tools, equipment, and materials. This course is designed to familiarize students with fundamentals of various metal occupations for the purpose of preparing them to select either welding, sheet metal, or machining for more highly specialized training in subsequent courses. Minimum performance requirements for this course are based on successful student completion according to the National Center for Construction Education and Research Center (NCCER) Occupation Standards and the National Institute for Metal-Forming Skills (NIMS) standards. Students who successfully complete the course in accordance with NCCER standards are eligible for registration with the NCCER National Craft Worker Registry or obtain NIMS credentials. The prerequisite for this course is Industry Fundamentals and Occupational Safety.

Course Standard 1

AC-IM-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

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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
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

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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
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 Standards of Excellence
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

AC-IM-2

Explore the history of the machining, welding, and sheet-metal trade.

- 2.1 Research and describe the history of the machining, welding, and sheet metal trade by utilizing technology, collaboration, and other sources.
- 2.2 Describe the history of the machining, welding, and sheet-metal trade through group discussions and written summary or presentation.

Course Standard 3

AC-IM-3

Demonstrate knowledge and practice of metals safety.

- 3.1 Identify and explain the common hazards in machining, sheet metal, and welding.
- 3.2 Demonstrate basic knowledge of Occupational Safety and Health Administration (OSHA), and the regulations related to preventive measures for personal safety.
- 3.3 Demonstrate the proper use and care of Personal Protection Equipment (PPE) used in machining, sheet metal, and welding.
- 3.4 Demonstrate the safe use of equipment in the metals laboratory.

Course Standard 4

AC-IM-4

Demonstrate proficiency in the use of hand and power tools specific to the trade.

- 4.1 Demonstrate knowledge of proper care, maintenance, and safe use of hand and power tools specific to the metals trade.
- 4.2 Demonstrate proficiency in the techniques of power and hand tools specific to the metals trade.

Course Standard 5

AC-IM-5

Demonstrate the ability to use measuring instruments specific to the metals trade.

- 5.1 Demonstrate proficiency in measuring work pieces with the English and metric system scales.
- 5.2 Demonstrate proficiency in the use of measuring tools used in the metals trade including but not limited to fillet weld gauge, caliper, micrometer, tape measure, divider, protractor, angle finder, etc.
- 5.3 Demonstrate proficiency in the proper care, cleaning, and storage of measuring instruments.

Course Standard 6

AC-IM-6

Demonstrate and explain the ability to safely set up and operate basic equipment for welding and cutting specific to the metal trade.

- 6.1 Identify and explain the use of oxyfuel cutting equipment.
- 6.2 Properly set up oxyfuel equipment for acetylene and alternate fuel gases (i.e. propane).

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- 6.3 Safely perform basic cuts, straight lines, arches, and piercing holes using oxyfuel equipment.
- 6.4 Identify and explain the Shielded Metal Arc Welding (SMAW) process.
- 6.5 Demonstrate proficiency in safely setting up SMAW equipment and welding continuous beads.
- 6.6 Identify and explain the Gas Metal Arc Welding (GMAW) process.
- 6.7 Demonstrate proficiency in safely setting up GMAW equipment and welding continuous beads.

Course Standard 7

AC-IM-7

Demonstrate the ability to perform basic layout for parallel line development.

- 7.1 Demonstrate proficiency in the selection and use of layout tools for parallel line development.
- 7.2 Demonstrate proficiency in the selection and use of hand tools and equipment for parallel line development.

Course Standard 8

AC-IM-8

Demonstrate and explain the ability to perform basic layout for machined projects.

- 8.1 Identify and explain the use of a conventional and Computer-Controlled Shaping Machine (CNC) machining equipment used in current manufacturing.
- 8.2 Demonstrate proficiency in the selection and use of basic layout tools used in the machining trade.
- 8.3 Demonstrate proficiency in the selection and use of machine shop equipment to produce basic layout projects.

Course Standard 9

AC-IM-9

Examine how SkillsUSA is a co-curricular part of career and technical education through leadership development, school and community service projects, and competitive events.

- 9.1 Explain the purpose, mission, objectives, motto, colors, official dress and other distinguishing characteristics of SkillsUSA.
- 9.2 Explain how participation in SkillsUSA can promote lifelong responsibility for community service, professional growth and development.
- 9.3 Explore the impact and opportunities that SkillsUSA can develop to bring business and industry together with education in a positive working relationship through innovative leadership and career development programs.
- 9.4 Explore the local, state, and national opportunities available to students through participation in SkillsUSA, including but not limited to conferences, competitions, community service, philanthropy, and other SkillsUSA activities.