

**Architecture and Construction Career Cluster  
Machining Operations I  
Course Number 48.59000**

**Course Description:**

This course provides students with the opportunity to acquire introductory skills on the lathe and milling machine, equipment used in the trade, attributes of successful machinists, industry credentialing, and career opportunities. Course topics include safety, measuring instruments, blueprint reading, and maintenance. Practical experience will be gained in the proper use and maintenance of hand tools, the pedestal grinder, the drill press, and band saws, job planning and management, quality control, and machinery maintenance. Performance standards for this course are based on National Institute for Metalworking Skills (NIMS) national standards for the topics of lathe and milling machine.

Additional topics of the course include addressing quality control, environmental protection, and housekeeping. Co-curricular activities of SkillsUSA are incorporated in the course. Students who successfully complete the course are eligible to enroll in Machining Operations II. The prerequisite for this course is Introduction to Metals.

**Course Standard 1**

**AC-MO1-1**

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

## Georgia Department of Education

<b>Nonverbal Communication</b>	<b>Written Communication</b>	<b>Speaking</b>	<b>Applications and Effective Résumés</b>
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.

<b>Teamwork and Problem Solving</b>	<b>Meeting Etiquette</b>
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.

<b>Problem Solving</b>	<b>Customer Service</b>	<b>The Application Process</b>	<b>Interviewing Skills</b>	<b>Finding the Right Job</b>
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-MO1-2**

**Demonstrate safety in the machining lab and classroom.**

- 2.1 List and explain general safety rules for the machining laboratory.
- 2.2 Identify and explain the location of the following: fire extinguisher(s), eye wash station, first aid kit, and emergency electrical shutoff.
- 2.3 Describe the types of fires possible in a machining environment and identify the appropriate fire extinguisher for each type of fire.
- 2.4 Demonstrate the use of a fire extinguisher.
- 2.5 Demonstrate basic first aid needed to stop bleeding and prevent shock.
- 2.6 Describe the procedure for obtaining outside emergency medical response.
- 2.7 Demonstrate using emergency shutoff procedures.
- 2.8 Demonstrate proper shop evacuation procedures.
- 2.9 Identify and describe the location of Material Safety and Data Sheets (MSDS).

**Course Standard 3**

**AC-MO1-3**

**Accurately measure to specific tolerances.**

- 3.1 Accurately measure work pieces with a 6 inch Standard rule.
- 3.2 Accurately measure work pieces with a 12 inch Standard rule.
- 3.3 Accurately measure work pieces 0-1" Micrometer.
- 3.4 Accurately measure work pieces with dial and vernier calipers.
- 3.5 Demonstrate the accurate use a dial indicator.

**Course Standard 4**

**AC-MO1-4**

**Identify and describe blueprint information.**

- 4.1 Identify and describe title block.
- 4.2 Identify and describe basic blueprint symbols and lines.

**Course Standard 5**

**AC-MO1-5**

**Demonstrate the ability to properly set up and use a pedestal grinder.**

- 5.1 Inspect and clean a pedestal grinder.
- 5.2 Inspect and position eye shields and tool rests.
- 5.3 Demonstrate the proper dressing of grinding wheels.
- 5.4 Demonstrate the proper sharpening of center punches and chisels.
- 5.5 Demonstrate the proper sharpening of drill bits.

**Course Standard 6**

**AC-MO1-6**

**Demonstrate the ability to properly set up and use a drill press.**

- 6.1 Demonstrate the proper inspecting and cleaning of a drill press.

- 6.2 Demonstrate the proper mounting and securing of a work piece.
- 6.3 Accurately calculate proper revolutions per minute (RPMs) on a drill press.
- 6.4 Demonstrate center drilling.
- 6.5 Demonstrate the proper drilling of pilot holes.
- 6.6 Demonstrate the proper drilling of blind holes.
- 6.7 Demonstrate the proper method of drilling through holes.

### Course Standard 7

#### AC-MO1-7

##### Perform necessary operations in order to use a lathe.

- 7.1 Identify and explain the parts of an engine lathe.
- 7.2 Demonstrate checking oil reservoirs and cutting fluid levels.
- 7.3 Accurately calculate feeds and speeds for various materials and material diameters.
- 7.4 Demonstrate the set-up of a lathe for various feeds and speeds.
- 7.5 Demonstrate grinding general lathe cutting tools with a pedestal grinder.
- 7.6 Demonstrate the set-up and alignment of the tool post.
- 7.7 Demonstrate the set-up of the three-jaw chuck.
- 7.8 Perform facing operations.
- 7.9 Perform center drilling operations.

### Course Standard 8

#### AC-MO1-8

##### Perform the necessary operations to use a milling machine.

- 8.1 Identify and explain the parts of a milling machine.
- 8.2 Accurately check oil reservoirs and cutting fluid levels.
- 8.3 Accurately calculate feeds and speeds for various materials and material diameters.
- 8.4 Demonstrate the set up a mill for various feeds and speeds.
- 8.5 Demonstrate the use an edge finder to find the edge of a part.
- 8.6 Perform center drilling operations.
- 8.7 Perform countersinking operations.
- 8.8 Perform drilling operations.
- 8.9 Perform taping operations.

### Course Standard 9

#### AC-MO1-9

##### Perform maintenance procedures.

- 9.1 Perform incidental and preventative maintenance on a milling machine, lathe, pedestal grinder, and drill press.
- 9.2 Demonstrate the proper completion of history forms for tracking maintenance.
- 9.3 Report maintenance problems to the teacher.

## Course Standard 10

### AC-MO1-10

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

- 10.1 Explain the purpose, mission, objectives, motto, colors, official dress and other distinguishing characteristics of SkillsUSA.
- 10.2 Explain how participation in SkillsUSA can promote lifelong responsibility for community service, professional growth and development.
- 10.3 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.
- 10.4 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.