Science, Technology, Engineering and Mathematics
Survey of Engineering Graphics
Course Number 48.54200

Course Description:

Survey of Engineering Graphics is the second course in the Engineering Drafting and Design Career Pathway. The course is designed to build student skills and knowledge in the field of engineering graphics/technical drafting. The course focus includes employability skills, career opportunities, applied math, working drawings that include sectional, auxiliary, detail and pictorial views, and pattern developments. In addition, elements in applied mathematics are integrated throughout the course. The prerequisite for this course is Introduction to Drafting & Design.

Course Standard 1

STEM-SEDG-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
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	Preparation and Participation in Meetings
Building Team Communication	Conducting Two-Person or Large Group Meetings
	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
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 Common Core GPS and Georgia Performance Standards

L9-10RST 1-10 and L9-10WHST 1-10:

Common Core ELA/Literacy standards have been written specifically for technical subjects and have been adopted as part of the official standards for all CTAE courses. Additional Common Core ELA/Literacy standards for Speaking and Listening are listed in the foundational course standards below.

Course Standard 2

STEM-SEDG-2

Demonstrate and follow safety, health, and environmental standards related to the STEM workplace and apply specific engineering tools, machines, materials and processes in a safe and orderly manner to formulate, analyze, and verify engineering practices and solutions.

2.1 Identify and describe the professional and/or trade associations related to the engineering and engineering graphics professions.

2.2 Identify related occupations within engineering graphics and engineering professions.

2.3 Research out employment opportunities and education requirements for engineering graphics and engineering professions.

2.4 Participate in activities related to career interests.

2.5 Analyze an ethical situation related to engineering graphics and engineering.

2.6 Maintain a journal that relates standards in the course to the project work.

Course Standard 3

STEM-SEDG-3

Analyze applied math required by business and industry for engineering graphics.

3.1 Analyze and apply correct tolerance in regards to (American National Standard for Information Systems) ANSI and National Institute of Standards and Technology (NIST) and other international bodies that control standards with the correct use of geometric constraints and symbols.

3.2 Estimate and measure using metric and imperial scale. Compare the estimate with the actual results and analyze.

3.3 Calculate the ratio and scale for specific problems.

3.4 Construct conversions.

3.5 Identify and describe the correct units on existing drawings.

3.6 Measure using an engineering Scale and basic rulers.

3.7 Present how to determine the appropriate tool use for measurements.

Course Standard 4

STEM-SEDG-4
Demonstrate purpose and correct application of sectional views.
4.1 Identify and explain sectional views: full, half, offset, revolved, removed and broken-out sections.
4.2 Determine the six sectional views from provided drawings.
4.3 Create technical freehand sketch of a sectional view.
4.4 Prepare drawings that require sectional views.
4.5 Recommend materials for sectional views including hatching patterns and appropriate symbols based on strength and product requirements.
4.6 Read and reproduce sectional view blueprint.
4.7 Create a sectional view from an existing multi-view drawing.

Course Standard 5

STEM-SEDG-5
Demonstrate purpose and correct application of Auxiliary views.
5.1 Identify and explain primary and secondary auxiliary views.
5.2 Recommend applications or purpose of auxiliary views for specific drawings or objects.
5.3 Create technical freehand sketch of an auxiliary view.
5.4 Prepare drawings that require auxiliary views.
5.5 Read, revise and produce auxiliary blueprint.

Course Standard 6

STEM-SEDG-6
Demonstrate purpose and correct application of pictorial views.
6.1 Identify and describe isometric and isometric exploded pictorial drawings.
6.2 Determine applications or purpose of pictorial drawings.
6.3 Create technical freehand sketch of pictorial drawings.
6.4 Prepare drawings that require pictorial view.
6.5 Read, revise and produce pictorial blueprint or an existing object or drawing.

Course Standard 7

STEM-SEDG-7
Cite evidence of developments in engineering graphics and engineering.
7.1 Identify and describe welding, sheet metal and geometric shapes as related to the general principals of pattern development.
7.2 Analyze applications or purpose of developments and patterns.
7.3 Apply concepts for various geometric shapes to patterns.

Course Standard 8

STEM-SEDG-8
Present appropriate views of an object.
8.1 Create a table that states the advantages and disadvantages of sectional, auxiliary, pictorial views and save electronically and in a portfolio.
8.2 Insert at least one drawing from the course that demonstrates sectional, auxiliary, and pictorial views into the portfolio and save electronically.

8.3 Create an original object and generate sectional, auxiliary and pictorial views.

8.4 Place in the portfolio and save electronically.

8.5 Review journal entries and write a short statement about what has been learned about tolerance, appropriate tool use for measurement, sectional view, auxiliary view, pictorial view, and developments.