

**Transportation, Distribution, and Logistics Cluster  
Fundamentals of Aerospace  
Course Number 47.46000**

**Course Description:**

This course is designed as the foundational course for both the Aviation Maintenance and the Flight Operations pathways. Students will gain a fundamental knowledge base in aviation history and regulations, the basic principles of flight, aerospace careers, and factors influencing work systems, aerospace technologies, and basic aviation meteorology. These concepts can later be applied to various aerospace occupations. Classroom and lab activities will assure students a thorough understanding of the aerospace environment. The pre-requisite for this course is advisor approval.

**Course Standard 1**

**TDL-FA-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

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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

**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

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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. Additional Georgia Standards of Excellence ELA/Literacy standards for Speaking and Listening are listed in the foundational course standards below.

### **Course Standard 2**

#### **TDL-FA-2**

**Explain aspects of aviation history and interpret aviation regulations.**

- 2.1 Recognize that contributions in aerospace are made by both individuals and teams.
- 2.2 Recognize aerospace is a catalyst for technological advancements in multiple disciplines and industries (medical, technology, safety, transportation).
- 2.3 Summarize the evolution of aviation science.
- 2.4 List the significant aerospace regulatory agencies and state the purpose and significance of each.

## **Support of CTAE Foundation Course Standards and Georgia Standards of Excellence**

**ELACC9-10SL1:** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

**ELACC9-10SL2:** Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

**ELACC9-10SL4:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

### **Course Standard 3**

#### **TDL-FA-3**

**Examine the various principles regarding flight.**

- 3.1 List and define the 4 forces of flight (force, thrust, drag, and lift).
- 3.2 Recognize the importance of Bernoulli's principle and Newton's laws of motion on the forces of flight.
- 3.3 Conduct scientific investigations that show forces acting on aircraft.
- 3.4 List and define the 3 axes of flight (longitudinal, lateral, and vertical).
- 3.5 Illustrate basic aircraft design principles (lighter than air, fixed wing, rotor craft, and space craft).

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**ELACC9-10SL4:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

**SPS8:** Students will determine relationships among force, mass, and motion.

- b. Apply Newton's three laws to everyday situations by explaining the following:
  - Inertia
  - Relationship between force, mass and acceleration
  - Equal and opposite forces

- c. Relate falling objects to gravitational force

## Course Standard 4

### TDL-FA-4

#### Explore the various careers in the aerospace industry.

- 4.1 Recognize at least four (4) general aerospace life cycle phases (engineering/design, manufacturing, operations, and maintenance).
- 4.2 Describe the research, development and testing processes used in aerospace industries.
- 4.3 List major aerospace employers in each life cycle phase (engineering/design, manufacturers, operations and maintenance) in the state and give examples of various jobs found at each.
- 4.4 List major job titles found in the flight operations area and describe their major duties.
- 4.5 List major job titles found in the aviation maintenance area and describe their major duties.
- 4.6 List major jobs and titles in the air field operations area and describe their major duties.

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**ELACC9-10SL4:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

## Course Standard 5

### TDL-FA-5

#### Analyze the human factors that affect our work environments.

- 5.1 Realize how important it is to mitigate human errors in the aerospace industry and investigate examples of how standardized processes and procedures minimize variance and human error.
- 5.2 Define the various parts of the SHELL model (software, hardware, environmental, liveware) and then describe how they interact.
- 5.3 Hypothesize how personal capabilities and behavior affect various parts of performance within the SHELL model (self-regulating system, reporting, and crew rest).
- 5.4 Understand that aircraft accidents are not a single factor event, but made up of many contributing causes.

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## Course Standard 6

### TDL-FA-6

#### Explore the major aerospace technology areas.

- 6.1 List various aerospace safety technologies and recognize events that brought them to fruition.
- 6.2 List various aerospace materials innovations and recognize events that brought them to fruition.

- 6.3 List various aerospace basic, radio, and advanced navigation techniques and tools and instances of when to use each.
- 6.4 List various forms of aerospace communications and the environments where each is typically used.

## Course Standard 7

### TDL-FA-7

#### Understand the basic aviation meteorology concepts.

- 7.1 List and describe the basic atmospheric conditions affecting weather and flight conditions.
- 7.2 Describe the relationship between the sun and earth as it relates to seasons and air circulation.
- 7.3 List and compare aviation weather forecasting and weather services and other public weather services.

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**ELACC9-10SL1:** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

**ELACC9-10SL4:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

**SM1:** Students will relate the formation, structure and composition of Earth's atmosphere to the processes that cause weather.

- c. Analyze the effect insulation has on the relative amount of heat energy in the atmosphere and how temperature differences give rise to phenomena such as Hadley cells and Ferrel cells.
- e. Compare the amount of water vapor in the atmosphere to characteristic atmospheric conditions.

**SM2:** Students will investigate energy transfer to types of clouds formed, precipitation, and air masses.

- a. Explain the relationship between air masses and the areas over which they form.
- b. Differentiate the four types of fronts, their structure, and the clouds and precipitation associated with each front.
- c. Relate weather events to the energy transfer within the Earth's atmosphere.
- d. Examine the role of energy transfer in the development of global weather patterns.

## Course Standard 8

### TDL-FA-8

#### Develop an understanding of aviation careers, describe the principal fields of specializations and identify associated career opportunities.

- 8.1 Identify education requirements for aviation occupations and locations where programs of study are available.
- 8.2 Match aviation job titles with qualifications and responsibilities.
- 8.3 Participate in activities related to career interests.

**Support of CTAE Foundation Course Standards and Georgia Standards of Excellence**

**ELACC9-10SL1:** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

**Course Standard 9**

**TDL-FA-9**

**Examine how related student organizations are integral parts of career and technology education courses 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 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.

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**ELACC9-10SL4:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.