

Implementation Date
Fall 2008

PROGRAM CONCENTRATION: Architecture, Construction,
Communications & Transportation
CAREER PATHWAY: Flight Operations
COURSE TITLE: Fundamentals of Aviation

This course is the foundation course for both the Aircraft Support and Flight Operations Pathways. Students will build a solid knowledge base in the history of aviation, the principles of flight and navigation, the aerospace community, and aviation meteorology. Classroom and laboratory activities assure a thorough understanding of the aviation environment. The course will help students make an informed pathway decision upon completion. Leadership development activities through the Civil Air Patrol (CAP), the Experimental Aircraft Association (EAA) and industry mentorship will prepare students with a competitive edge for the global marketplace.

SCIENCE AS INQUIRY

ACT-FA-1. Students will develop an understanding of scientific inquiry by using technology and mathematics to analyze explanations and models as applied to aerospace.

- a. Design and conduct scientific investigations that explore factors that affect flight.
- b. Recognize and analyze alternative explanations and models used in designing aircraft.
- c. Understand the essential nature of mathematical tools and models used in the aerospace industry.
- d. Understand the influence of historical and current scientific knowledge on the development of new aerospace technologies.

ACADEMIC STANDARDS:

SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.

PHYSICAL SCIENCE

ACT-FA-2. Students will develop an understanding of the structure and properties of matter; will understand laws of motion, force and universal gravitation as they apply to flight; and will understand conservation of energy and interactions of energy and matter.

- a. Conduct scientific investigations that show forces acting on an airplane.

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- b. Design and conduct experiments that demonstrate rocket propulsion.
- c. Apply Newton's Laws of Motion to flight.
- d. Understand how different aircraft engines convert fuel into kinetic energy.

ACADEMIC STANDARDS:

SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.

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

EARTH AND SPACE SCIENCE

ACT-FA-3. Students will understand how energy in the earth system affects climate and will identify ways weather affects flight.

- a. Describe the relationship between the sun and earth as it relates to seasons and air circulation.
- b. Understand that weather is a dynamic process affected by the earth's rotation and static land features.
- c. Relate weather principles to the operation of an aircraft.
- d. Identify air mass characteristics and their effects on flight.
- e. Demonstrate an understanding of the water cycle.

ACADEMIC STANDARDS:

SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.

S1E1 Students will observe, measure, and communicate weather data to see patterns in weather and climate.

SCIENCE AND TECHNOLOGY

ACT-FA-4. Students will recognize that technology is used to solve societal problems, often resulting in new scientific knowledge, and will identify emerging technologies incorporated in the aerospace industry.

- a. Understand the abilities of technological design.
- b. Understand the evolution of technologies that have advanced aviation.
- c. Relate how new technologies often lead to new challenges in aerospace.

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- d. Recognize the value of creativity, imagination, and a good knowledge base to successful engineering and design.
- e. Understand that technological design is driven by the desire to meet human needs and solve human problems.

ACADEMIC STANDARDS:

SCSh7. Students will analyze how scientific knowledge is developed.

HISTORY AND NATURE OF SCIENCE

ACT-FA-5. Students will recognize the importance of the global contributions of individuals and teams to aerospace and will understand the pursuit of aerospace as a career or hobby can be both fascinating and intellectually rewarding.

- a. Recognize aerospace as a human endeavor.
- b. Acknowledge that aerospace plays a vital role in society.
- c. Understand that contributions in aerospace are made by both individuals and teams.
- d. Identify some of the unique aspects of careers in aerospace.

ACADEMIC STANDARDS:

SCSh7. Students will analyze how scientific knowledge is developed.

CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEC), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

CTAE-FS-1 Technical Skills: Learners achieve technical content skills

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necessary to pursue the full range of careers for all pathways in the program concentration.

CTAE-FS-2 Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-3 Communications: Learners use various communication skills in expressing and interpreting information.

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

CTAE-FS-5 Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-6 Systems: Learners understand a variety of organizational structures and functions.

CTAE-FS-7 Safety, Health and Environment: Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

CTAE-FS-8 Leadership and Teamwork: Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

CTAE-FS-9 Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

CTAE-FS-10 Career Development: Learners plan and manage academic-career plans and employment relations.

CTAE-FS-11 Entrepreneurship: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.