Implementation date
Fall 2010

PROGRAM CONCENTRATION: **Government & Public Safety**
CAREER PATHWAY: **JROTC – Air Force**
COURSE TITLE: **Aerospace Science: A Journey Into Aviation History**

Course Description:
The aviation history course provides students a background of the development of flight from early myths to the present as part of an historical overview of American warfare. Students will focus on aviation issues, objectives, strategy, technology, scientific advances, forces, milestones, and assessments. Students examine major figures in aviation history while investigating the heritage of flight, the development of air power through the use of scientific knowledge, the historic role of airpower during wartime, aerospace aviation technological advances, and contemporary aviation.

PS-AFAH-1. Students will understand historical continuity and change related to mankind's early attempts to fly from ancient times, starting with the Chinese and going to DaVinci.

a. Describe the early Chinese kites and rockets
b. Identify Leonard DaVinci's contributions to flight
c. Explain the principle of bird flight, how man tried to mimic birds in flight, and why man and machines do not fly the way bird fly.

Academic Standard(s):
SSWH9 The student will analyze the change and continuity in the Renaissance and Reformation.

PS-AFAH-2. Students will investigate the development of lighter-than-air flight.

a. Compare and contrast the use of balloons during the US Civil War and the Spanish American War.
b. Explain the manufacturing advancements and scientific discoveries during the development of heavier-than-air aircraft from DaVinci to the Wright brothers.
c. Explore the lives and contributions of all the inventors listed in the text who contributed to flight from DaVinci to the Wright brothers.

Academic Standard(s):
SSWH9 The student will analyze the change and continuity in the Renaissance and Reformation.

NCHS: Basic Edition, p. 101. Understands military events that influenced the outcome of the Civil War.

NCHS: U.S. History, Expanded Edition, p. 125. Understands military events that influenced the outcome of the Civil War.

Implementation date
Fall 2010

PS-AFAH-3. Students will analyze the specific ideas and beliefs that lead to the success of the Wright brothers in achieving heavier-than-air flight.

a. Analyze the effect of "chance events" and specify how these events led to the Wright brothers' success.
b. List the principles of air flight.
c. Explain how the consequences of human intentions were influenced by the means of carrying them out in examining the contributions of the early aviation pioneers.
d. Identify the anatomy of the early aircraft.

Academic Standard:
SCSh7 Students will analyze how scientific knowledge is developed. Students will recognize that:

PS-AFAH-4. Students will analyze the specific ideas and beliefs that lead to the success of other pilots and inventors following the Wright brothers in 1903 until World War I.

a. Explain how the consequences of human intentions were influenced by the means of carrying them out in examining the contributions of the early aviation pioneers.
b. Identify the early aircraft by name and explain the significance of each.
c. List the various pilots/inventors who contributed to flight during this period as well as their contributions and their personal information including what drove them to fly.

Academic Standard:
SCSh7 Students will analyze how scientific knowledge is developed. Students will recognize that:

PS-AFAH-5. Students will explain the contributions aircraft and pilots had during WWI and how the aircraft revolutionized war.

a. Identify the contributions military pilots made to flight during WWI and explain the long lasting implications of each contribution.
b. List the various roles the aircraft played during WWI and how they revolutionized war tactics.
c. Explain all the new developments in aviation during WWI and analyze why these developments were intensified during the war.

Academic Standard(s):
SCSh7 Students will analyze how scientific knowledge is developed. Students will recognize that:

NCHS: Basic Edition, p. 113. Understand influences on the outcome of World War I.

NCHS: U.S. History, Expanded Edition, pp 174, 176-177. Understand influences on the outcome of World War I.

Implementation date
Fall 2010

PS-AFAH-6. Students will identify the significance of and major contributions of the barnstormers after WWI.

a. Create a timeline identifying the major milestones and aviation pioneers who achieved those milestones between WWI and WWII.
b. Explain how public sentiment and awareness was awakened by the barnstormers and has continued to influence development of flight.

Academic Standard(s):
SSUSH16 The student will identify key developments in the aftermath of WW I.

NCHS: Basic Edition, p. 113. Understand influences on the outcome of World War I.

NCHS: U.S. History, Expanded Edition, pp 174, 176-177. Understand influences on the outcome of World War I. Understands arguments and theories regarding the causes of World War I.

PS-AFAH-7. Students will identify the significance of trans-Atlantic flight and the contributions of Charles Lindberg and Amelia Earhart to flying.

a. Explain the concept of a milestone flight and identify the various milestones that occurred from the Wright brothers to Charles Lindberg and Amelia Earhart.
b. Describe mainstream and determine why flight became mainstream during this period.
c. Identify the aircraft involved in the first aerial refueling and detail how this feat was accomplished.

Academic Standard(s):
SSUSH16 The student will identify key developments in the aftermath of WW I.

NCHS: Basic Edition, p. 113. Understand influences on the outcome of World War I.

NCHS: U.S. History, Expanded Edition, pp 174, 176-177. Understand influences on the outcome of World War I. Understands arguments and theories regarding the causes of World War I.

PS-AFAH-8. Students will identify the significance of the further development of commercial aircraft.

a. Describe the various steps and personnel involved in the early development of commercial aircraft, including the aviation research developments, and identify the varied uses of the commercial aircraft.
b. Examine the development and use of helicopters including the personnel involved, the problems they encountered, and how the early helicopters were employed.
c. Identify governmental involvement and controls that were put in place as commercial flights were developed.

Implementation date
Fall 2010

Academic Standard:

SSUSH16 The student will identify key developments in the aftermath of WW I.

PS-AFAH-9. **Students will learn the history of the Air Corps and the resultant organizations that preceded the Air Force.**

a. Create a timeline identifying the major milestones involved in the creation of the Army Air Corps and the subsequent Army Air Service.
b. Identify significant contributions the Army Air Corps/Service made to aviation and defense.
c. Compare and contrast the rationale of both the advocates and the opponents of a separate Air Force.

PS-AFAH-10. **Students will identify the significant developments of airpower as the flying force evolved during WWII.**

a. Explain the strategic role of aircraft during WWII including the aircraft, missions, scientific advances, and personnel involved.
b. Identify the significance of airpower during D-Day and in both the European and Pacific theaters during WWII.
c. Explain how pattern bombing and combat functions evolved and changed during the war, paying attention to the reasons for these changes and the results of these changes to mankind, aircraft, and the overall status of war.
d. Describe the development of aircraft (bombers, fighters, transports) during WWII, explaining the scientific and technological advancements that were made as a result of those developments.

Academic Standard(s):

SSUSH19 The student will identify the origins, major developments, and the domestic impact of World War II, especially the growth of the federal government.

SSWH18 The student will demonstrate an understanding of the global political, economic and social impact of World War II.

North Carolina Computer Standards, p. 174. Know the role of technology in a variety of careers [aviation].

NCHS: Basic Edition, p 200. Understands President Roosevelt's ideas and policies during World War II.

NCHS: Basic Edition, p 200. Understands how World War II influenced the home front.

NCHS: World History, expanded edition, pp 253, 255, 267, 269. Understands the overall effect of World War II on various facets of society. Understands the climax and moral implications of World War II.

Implementation date
Fall 2010
NCHS: U.S. History, Expanded Edition, pp. 179-180. Know that science and technology are pursued for different purposes.

Texas Technology Education/Industrial Technology Education, p. 42c11C. Know ways in which social and economic forces influence which technologies will be developed and used.

PS-AFAH-11. Students will describe the history of commercial aircraft and the key developments in aircraft and use that occurred through the years.

a. Identify key contributors to commercial flight and list contributions of each.
b. List period commercial aircraft and explain the difference from one aircraft to another.
c. Explain the various commercial airlines that operated over the years and how they evolved into the current companies.
d. Identify the pros and cons of commercial travel.
e. Describe the jet engine components and how these components make the jet engine work.

Academic Standard(s):
NCHS: Basic Edition, 66. Understands how past events are affected by the irrational and the accidental.

PS-AFAH-12. Students will identify the significance of a separate Air Force and the major defense contributions made by the Air Force during the first sixty years it existed.

a. Describe the National Security Act of 1947 and the reasoning behind this Act.
b. Identify personnel who were crucial to the development of the Air Force, including the significant Air Force leaders.
c. Create a timeline that identifies the beginning and end of the Cold War, including all the critical components of that War.
d. Explain the USAF contributions during the Berlin Airlift, the Korean War, the Vietnamese Conflict, the Cuban Missile Crisis, the Cold War, the Gulf War, Operation Enduring Freedom, and Operation Iraqi Freedom.
e. Identify aircraft, missile, and nuclear developments that occurred during this time.
f. Describe the purpose and membership in the North Atlantic Treaty Organization.

Academic Standard(s):
SSWH20 The student will examine change and continuity in the world since the 1960s.

NCHS: Basic Edition, p. 209. Understands the impact of relations between the United State and the Soviet Union during the Cold War.

NCHS: World History, expanded edition, pp. 270-272. . Understands the impact of independence movements in various countries and whether they were successful.

Implementation date
Fall 2010

PS-AFAH-13. **Students will understand the significance of space exploration.**

a. Identify the current structure and composition of our solar system.
b. Identify the scientists who have added to our knowledge of the space system and their contributions.
c. Explain how early rocketry mad e the current space program possible.
d. Describe the beginning of the space race including the rivals, the missions, and the scientific advances of each mission.

Academic Standard(s):

SES1 Students will investigate the composition and formation of Earth systems, including the Earth's relationship to the solar system.

NRC: National Science Education Standards, pp 175-176, 192-193, 200-201, 204. Understand that individuals and teams contribute to science and engineering at different levels of complexity.

Project 2061: Benchmarks for Science Literacy, p 8, 19, 47. Understand how scientific knowledge changes and accumulates over time.

NAEP: 1990 Science Objectives, p 26. Know that conceptual principles and knowledge guide scientific inquiries; historical and current scientific knowledge influence the design and interpretation of investigations and the evaluation of proposed explanations made by other scientists.

PS-AFAH-14. **Students will identify the significant scientific and technological developments of the space race.**

a. Describe rocketry developments from the Chinese to Goddard to the present and the significance of each development.
b. Explain the principles of rocketry.
c. Create a timeline to identify significant development in the US space program, including the development of NASA, the use of the space shuttle, and other significant milestones.
d. Compare and contrast expendable and reusable rockets.
e. Identify current and anticipated developments in manned air vehicles, unmanned systems, and cyber warfare.
f. Describe NASA's Orion spacecraft and Ares launch vehicle and their plans for the future.

Academic Standard(s):

TE Texas Technology Education/Industrial Technology Education, p. 44c33C; p. 44c8C. Know different requirements for structural design.

NRC: National Science Education Standards, pp 175-176, 192-193, 200-201, 204. Understands how scientific knowledge changes and accumulates over time.

Implementation date
Fall 2010
Project 2061: Benchmarks for Science Literacy, p 8, 19, 47. Know that scientists conduct investigations for a variety of reasons.

NAEP: 1990 Science Objectives, p 26. Understands how scientific knowledge changes and accumulates over time.