Texas Education Agency

Aviation Ground School

PEIMS Code: N1304675
Abbreviation: AVIAGS
Grade Level(s): 11-12
Award of Credit: 1.0

Approved Innovative Course

- Districts must have local board approval to implement innovative courses.
- In accordance with Texas Administrative Code (TAC) §74.27, school districts must provide instruction in all essential knowledge and skills identified in this innovative course.
- Innovative courses may only satisfy elective credit toward graduation requirements.
- Please refer to TAC §74.13 for guidance on endorsements.

Course Description:

This course is designed to extend student interests in all aspects of aviation while preparing students to take the formal ground requisite exam for the Federal Aviation Administration (FAA) FAA Airman Knowledge Test which is required to obtain a private pilot's license. The rigor of the course challenges students with complex aeronautical, engineering, weather, management and judgement concepts. Rules, regulations, obligations, and commitments to discipline and focus are foundational throughout the course. The ability to grasp flight without actually flying a real aircraft extends well beyond the classroom as students learn navigation, weather science, attention to detail (mathematical fuel and load planning), health and mental well-being related to flight planning and piloting aircraft.

Essential Knowledge and Skills:

(a) General Requirements. Recommended prerequisites: Algebra I, Introduction to Unmanned Aerial Vehicles, Introduction to Aircraft Technology, or Junior Reserve Officer Training Corps (ROTC) II. Students shall be awarded one credit for the successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.

(3) This course is designed to extend student interests in all aspects of aviation while preparing students to take the formal ground requisite exam for the Federal

Aviation Administration (FAA) FAA Airman Knowledge Test which is required to obtain a Private Pilot's License. The rigor of the course challenges students with complex aeronautical, engineering, weather, management and judgement concepts. Rules, regulations, obligations, and commitments to discipline and focus are foundational throughout the course. The ability to grasp flight without actually flying a real aircraft extends well beyond the classroom as students learn navigation, weather science, attention to detail (mathematical fuel and load planning), health and mental well-being related to flight planning and piloting aircraft.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.

(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:

(A) demonstrate the principles of group participation and leadership related to citizenship and career preparation;

(B) identify and demonstrate employers' expectations and appropriate work habits;

(C) discuss and analyze the competencies related to aviation resources, information systems, and technology;

(D) demonstrate awareness of the technical knowledge and skills related to human factors in health and safety in the workplace, as specified by appropriate governmental regulations and an understanding of personal responsibility in this area;

(E) apply reasoning skills to a variety of simulated workplace situations in order to make ethical decisions;

(F) apply techniques and skills involved in planning and decision making; and

(G) analyze elements of individual and group behavior, the importance of the communication process, and the characteristics of a good leader.

(2) The student discusses the professional standards required by and career opportunities in the aviation industry. The student is expected to:

(A) identify current and emerging careers in the aviation industry;

(B) examine aviation industry information such as industry reports and periodicals, during the career planning process;

(C) identify employment opportunities, including entrepreneurship opportunities, and certification requirements for the field of aircraft operation;

(D) identify the credentials and certification requirements for careers in the aviation industry such as licensed pilot;

(E) explain and use standard aeronautical tools for flight planning including navigational plotters, E6B circular slide rule calculator, and electronic calculators;

(F) demonstrate an understanding of Statute and Nautical measurement the customary standard Aviation measurement systems;

(G) research and compile health and safety policies, procedures, regulations, and practices of the aviation industry; and

(H) use aviation industry technological resources in diverse and changing personal, community, and workplace environments.

(3) The student researches professional, ethical, and organizational norms of the aviation industry. The student is expected to:

(A) define legal terminology that is used in the aviation industry;

(B) discuss professional responsivity as it relates to the FAA part 107 license;

(C) discuss ethical aviation operation as it relates to current regulations; and

(D) identify common organizational norms present within the aviation industry.

(4) The student describes the fundamentals of flight, including training, aircraft systems, flight instrumentation and controls, engines and supporting operating systems, and the aerodynamics of flight. The student is expected to:

(A) discuss the objectives and goals of a flight crew or pilot training program;

(B) identify and describe aircraft components and systems;

(C) identify various flight instrument functions, operating characteristics, errors, and common malfunctions;

(D) describe the importance and analyze various aspects of engine- related mechanical systems and operating processes;

(E) describe the four forces of flight, including lift, weight, thrust, and drag, and the relationship between these forces during flight, including how an aircraft accelerates to fly during takeoff, maneuvers to turn, changes direction, climbs, descends, and how to slow down and land;

(F) analyze load factors and apply mathematical formulas of weights and balances, including center of gravity computation and risks to out-of-balance flight especially during takeoffs and landings;

(G) explain how an aircraft maneuvers and retains stability control along the three axes of flight, including pitch/lateral, roll/longitudinal, and yaw/vertical; and

(H) define and analyze the fundamentals of aerodynamics through all phases of flight, including risk factors leading to stall/spin scenarios and describe methods to avoid or recover from uncontrolled flight situations.

(5) The student examines flight operations in the environment around controlled and uncontrolled airports as well as in the en-route flight structure of the United States Airspace System. The student is expected to:

(A) identify and explain terms unique to aviation, airports, the National Airspace System (NAS) and the Federal Aviation Regulations (FARs);

(B) analyze important safety considerations, including collision avoidance procedures, right-of-way rules, and minimum safe altitudes;

(C) identify and explain airport markings, lighting, aeronautical charts, and classes of airspace through the use of visual aids and graphics;

(D) analyze the severity of runway incursions of aircraft during ground operating phases;

(E) describe radar, transponder operations, FAA equipment, services and applications to Visual/Instrument Flight Rule (VFR/IFR) operations;

(F) discuss Flight Services and other weather and en-route support services;

(G) demonstrate the use of radio for communication;

(H) research and summarize sources of flight information and regulations, including the Aeronautical Information Manual (AIM), Federal Aviation Regulations (FAR) from the Code of Federal Regulations (CFR) and FAA advisory circulars and the National Transportation Safety Board (NTSB); and

(I) analyze and create routes on an aeronautical chart using VFR guidance and resources for flight planning, including the Airport Facility Directory (AFD) to select runways, avoid NAS restrictions, navigate through appropriate airspace.

(6) The student analyzes weather conditions and effects on aircraft operations. The student is expected to:

(A) identify the causes of various weather conditions, frontal systems, and hazardous weather phenomenon;

(B) determine methods to avoid critical weather situations, including thunderstorm-related hazards, both from the ground and during flight;

(C) identify the causes of and describe ways to avoid wind shear and wake turbulence;

(D) interpret weather reports, data, and graphics;

(E) identify sources of weather information such as National Oceanic and Atmospheric Association (NOAA), Federal Aviation Administration (FAA), Flight Service Stations (FSS), internet-based Direct Users Access Terminal System (DUATS), or inflight radio during preflight planning and while in-flight; and

(F) analyze and determine go/no-go decisions such as flying around a threatening weather situation or making a plan to divert and land at an alternate airport, related to the avoidance of critical weather situations described in a variety of printed, transcribed, and internet weather reports and forecasts.

(7) The student explains aircraft operation within set limitations supplied by the FAA-approved Pilots Operating Handbook or Flight Manual. The student is expected to:

(A) predict airplane performance, including takeoff and landing distances, climb performance, fuel consumption, and range using data supplied by various aircraft manufacturers or designers;

(B) calculate weight and balance requirements for safe flight;

(C) explain the functions of aircraft navigation computers;

(D) describe the basics of air navigation such as identifying location and range using the airborne receiving systems, using aeronautical charts and radio navigational aids, including radio detection and ranging (RADAR), Global Positioning Systems (GPS), Very High Omni Range (VOR), and Automatic Direction Finding (ADF) systems;

(E) describe, using appropriate aviation terminology, the effect of density and pressure altitude on aircraft performance, including the relevance and impact of high density altitude on the performance of an aircraft in changing atmospheric conditions of temperature and pressure;

(F) explain concepts of VFR pilotage, dead reckoning, and radio navigation using various aircraft navigational systems; and

(G) analyze guidelines and recommend procedures related to flight planning, use of an FAA Flight Plan, VFR cruising altitudes as well as the application of en-route and timely lost emergency procedures.

(8) The student applies principles of Aeronautical Decision Making (ADM) and flight-related physiological factors. The student is expected to:

(A) identify and explain physiological factors as they relate to pilot health, including hypoxia, vertigo, vision, and the improper use of alcohol, illicit, and over-the-counter drugs;

(B) describe concepts and demonstrate the accepted procedures pertaining to ADM and judgement, including Cockpit Resource Management (CRM) and human factors such as varieties of negative and consequential attitudes pilots may exhibit which lead to avoidable incidents;

(C) discuss and evaluate ADM and judgment scenarios;

(D) implement a variety of planning processes for cross-country flight including the use of prepared planning aids;

(E) identify the details of flying a cross-country flight, including evaluation of in-flight weather or pilot well-being; and

(F) evaluate alternative plans for when unforeseen events occur in the flight environment due to weather, maintenance, or other factors.

Recommended Resources and Materials:

Jeppesen Private Pilot Manual
Federal Aviation Regulations & Aeronautical Information Manual
Current Jeppesen Written Test Guide
ASA and Jeppesen Private Pilot Course DVD Series
Area Flight Charts (Sectionals and World Aeronautical Charts)
E6B Flight Computer
Flight Plotter

USAF JROTC Aviation Honors Ground School (AHGS) Program as formally established and set forth by published AFJROTC Curriculum Guide, 2018-19 (updated March 2018), Curriculum Directorate, Holm Center/CJR, 60 Shumacher Ave, Bldg 803, Maxwell AFT, AL, 36112-6106

- Leadership Education 400: Principles of Management Text
- Aerospace Science 400/500 Syllabus of Instruction

Recommended Course Activities:

- Use of coordination with local Flight Service Station (FSS) and Automated Transcribed Weather Broadcast Services (ASOS and TWEB) broadcasts;
- Access and use of aviation weather planning site, www.aviation.gov

These resources lead to the required activity to plan a flight with three navigation legs.

- Weather interpretation
- Working weight and balance problems
- Filing a flight plan with the local FSS

Suggested methods for evaluating student outcomes:

Students are evaluated through use of written exams and essays presented throughout the conduct of the course throughout the year. Computer generated exams similar to the actual FAA exam will be presented while students also demonstrate cognitive writing abilities as they explain certain concepts and exhibit an increasing grasp of the block-building course objectives. Website access will require student class participation through the development of homework assignments.

Teacher qualifications:

- Trade and Industrial Education: Grades 6-12. This assignment requires appropriate work approval.
- Trade and Industrial Education: Grades 8-12. This assignment requires appropriate work approval.
- Vocational Trades and Industry. This assignment requires appropriate work approval.

Additionally, and in order to recommend the student to take the FAA Private Pilot written exam, the instructor must hold one of two appropriate certifications: 1) A Flight Instructor with appropriate Airplane Class and Category (FAR part 61.193(2), in this case, Private Pilot or 2), the FAA Ground Instructor Certification (FAR part 61.215).

Additional information:

Schools authorized by the USAF with an appropriately certified AFJROTC instructor may offer this course as the Aviation Ground Honors School (AHGS) also coded officially as USAF JROTC course Aerospace Science (AS) 500.

The program allows qualified AFJROTC students to obtain additional knowledge and skills required to advance their interests and potential in the aviation industry while continuing to develop leadership qualities in community and industry required of a JROTC Cadet. Cadets who

demonstrate potential at the honors level during their LE2 (sophomore) or LE3 (junior) years, such as gifted and talented (GT) or Advanced Placement (AP) coursework, will be considered. A waiver may be granted to one of the two requisite years by the instructor if a student demonstrates the level of knowledge required of a 2nd year Cadet (2nd year student in JROTC).

This course further emphasizes the leadership requirements of a 3rd or 4th year JROTC Cadet who must demonstrate skills in management, organization and communication required by the AFJROTC Leadership Education 400 level text and the Aerospace Science 400 (AS) syllabus.

The AFJROTC-approved teacher is a rated USAF officer and FAA-certified flight instructor with experience in teaching this course to students as well as adults in military flight training programs and colleges. For this course to be allowed as part of the AFJROTC curriculum the AFJROTC-certified instructor is required to be a rated (pilot) officer of the United States Air Force. This is additional to the qualification as a Certificated Flight or Ground Instructor (CFI) by the FAA; this is required due to the military preparedness aspect of this course and dovetails an aspect of military flight training culture into the civilian flight training aspect.