Introduction to Air Traffic Control Course

Washburn
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Abstract: This course will introduce students to the world of air traffic management both on the ground and in the air. The student will become aware of the types of airspace both controlled and uncontrolled, terminology used by air traffic controllers, meteorologists and pilots. Towards the end of the course, the students will apply gained knowledge by using a computerized radar simulation program and role-playing as a pilot and controller. The class will visit ATC facilities during the semester. They will hear from guest speakers who work within this industry. FAA ATC mentors will work with the students during this course.
Dates: -

Enduring Understandings

Air Traffic Control today is a vital part of air safety. This is one of the Federal Aviation Administration's biggest tasks in the area of air safety; the control of air traffic. Air traffic control is all about keeping aircraft safely separated thus preventing air accidents.

Standards

ID	Standards	Benchmarks

Essential Questions

Why was it necessary to introduce airspace regulations? What were the processes that took place during these early days?

Just like the motorist, the pilot need maps and charts. Why is this so? How difficult would it be to navigate our skies with out accurate maps and charts?

Why do we need laws and regulations. Why can't pilots just do their own thing? Who controls the skies and why?

What are "Aides to Navigation"?

Consider various airspace like the rooms in your house, different sizes, different heights above the floor and different ways to enter and leave them. In some cases you need permission to come or go from them. Why would airspace be like this?

Why do the military require special consideration and requirements? Why as a civil pilot, do we need to understand this?

What instruments in the plane make navigation easier? What would life be like for the pilot today, be like without them?

Why can't one controller manage all aircraft everywhere? Why do they need so many people?

We all know how weather effects the day to day routine of our lives, How does it affect the safe operations of aircraft? When do you fly? When don't you fly? Who can help the pilot make these decisions?

What Careers are there available within the ATC field? What would YOU consider "Just the job for you"?

Concepts

The student will explore words and terms taken from the "Glossary" in the set class text. They will also link words and terms and develop concepts that make the world of Air Traffic Control picture clearer. The student will compare what they consider "old" and what they consider "new" or excepted as a "norm". For example, airplane speeds, volume of air traffic, the development of the computer and how it improved the life of a pilot and the controller.
The student will conceptualize differences in is as humans and how we may have had difficulties living and being a pioneer aviator prior to the current age of airspace control.
The student will appreciate what technology has done and how it improved safety in the air.

Skills

The following skills will be developed throughout the duration of this Air Traffic Control course>

Skill #1

Good listening skills. The student will develop listening manners, techniques in concentrating on class speakers. They will complete a "Guest Speaker" worksheet or video worksheet when required.

Skill #2

Acceptable speaking and presentation skills. The student will develop these skills through class presentations.

Skill #3

Neat and accurate note taking skills. The student will take personal notes during class time. Be able to recall information from their notes and have them available when allowed during open book testing.

Skill #4

Manners and respect. The student will be expected not requested, to display manner necessary for the good climate of the classroom, especially when a visitor in in our presence. Aviation is an exacting industry and if these skills can't be maintained, the industry will find the student unsuitable as a member.

Skill #5

The development of good computer and research skills.

Summative Assessment
Title:
Major Research Assignments

Description:
Project #1 (1st Quarter)

The student is to write a research paper on his/her findings on an aspect of Air Traffic Control that appeals to him/her or captured his/her imagination. The materials for this assignment should be drawn from the first 6 units of work.

Project #2 (2nd Quarter)

The student will develop on a chart, an airfield of their own design, he/she will produce an airfield directory on the designed field. The new airfield will be given and name and will be located somewhere on the "Twin Cities" chart
This project will be presented to the class.

Formative Instruction/Assessments

Introduction to Air Traffic Control is a sequential fourteen unit course of study. The students will cover each unit and their knowledge gained will be assessed at the end of each unit by a small quiz. There will also be a mid-term and a semester final exam.

Week 1. Study Skills, Research skills, note taking skills.

Unit #1. The history of air traffic control. This unit looks at the period of flight within the United States before the skies were managed by a variety of agencies. These early days saw pilots flying anywhere, any time in any class or type of airplane.

Unit #2. Charts, maps and hand held devices a pilot uses to plan a flight. The student

will have to study the variety of maps and charts the pilot requires for safe flight. Simulated exercises will be conducted by plotting courses on a chart and identifying the many symbols on the approved charts.

 Unit #3. This unit looks at the National Transport Safety Board (NTSB). The student will develop an understanding of the many regulations, restrictions and freedom such as an authority is responsible for. The student will see a number of specific case studies where the control of the air by an authority has kept safety in check, particularly with an increase in air traffic in our skies.

 Unit #4. Aides to navigation. The pilot has at his/her fingertips a number of navigation devices in the cockpit. This unit explores such devices from the radio to the VOR and the NDB. The explosive developments of GPS, collision avoidance and storm scopes will also be covered. The student will also look at how the controller on the ground uses such instruments to communicate with the pilot and vise versa.

 Unit #5. The airspace system. In the eyes of pilots and controllers, the air above the ground is divided, parceled and labeled. These clumps of airspace comes in a variety odd shapes and sizes, heights above the ground which demands the pilot to approach them in different ways. This unit explores these aspects, it also explores the types of airspace and how to identify them.

 Unit #6. Special use airspace. We share the skies with the military. Many military aircraft are very high speed aircraft operating on at times special missions or training tasks. The student will also come to identify and understand the concept of military training routes, MOA's, Prohibited and restricted airspace. We will also look at how the controller, and administrating authorities provide the pilot to navigate through or above such airspace.

 Unit #7. Transponders and other aircraft onboard aides that help keep our airspace safe. There are several instruments the pilot uses during normal flight, some monitor the performance of the airplane, others assist the pilot with the attitude of flight and others are important for navigation. It's this last group of instruments that enable both the pilot and the controller to allow the pilot to navigate without incident across the skies.

 Unit #8. The approach controller, the departure controller, the ground controller, the tower controller and the en-route controller. The responsibility of ensuring safe flight for the pilot is handled by people with specific skills and tasks. These tasks will be explored in depth and the student will understand where each task is put to use and what equipment and skills are required.

 Unit #9. The one thing that kills more pilots and passengers than aircraft component failure is weather. The FAA through agencies associated with ATC provides pilots with continued updates of current weather across the country and around the globe. The student will study aspects of aviation meteorology in this unit and how information is conveyed to pilots on the ground and in the air.

 Unit #10. The airfield design and layout. The tower controllers sit and work high off the ground. It's important that they have a good and unobstructed view of all directions to identify aircraft taxiing taking-off and parking. On the ground collisions (runway incursions) are unfortunately a common occurrence. Not only is the ability of the controller important, but the physical layout of the airport important. Aircraft are getting bigger, larger in numbers and faster, therefore the controller has to adjust time intervals (separation) between moving aircraft and enable the operators to have their carriers get their job done in the most economical way. Airline companies make money by keeping their planes full and in the air. A quick turn around means less fuel and more passengers in seats.

Unit #11. En-route controllers. When a planes departs an airfield with a destination in mind, the pilot will communicate with a number of ATC facilities en-route. It's impossible for one facility in one location to watch over this flight. Therefore the flight will be often "Handed over" from one facility to another. En-route controllers are responsible for the airspace in a geographical area above the surface of the earth. The student will explore this concept and by using charts, will simulate a cross country flight.

Unit #12. In flight emergencies. The controller can be a guiding hand to a pilot during an in-flight emergency. There are a number of support systems armed and ready to kick in if this situation occurs. The controller, the person on the ground is well trained to execute what need to be done in such a situation. The student will understand what plays out when an emergency situation arises. The student will also learn about Emergency Locator Transmitter (ELT). A device installed in every aircraft.

Unit #13. Careers in Air Traffic Control. In this second last unit the student will explore the many jobs and training packages that one would need to enter this line of work. On top of this, there are avenues for careers in related fields such as meteorology, radio and facility maintenance, aircraft dispatchers, radio installers plus many more. All of which makes life easier for the pilot.

Unit #14. Tracon training. The student will complete this course using a computer simulated ATC radar system centered around the Twin Cities. The student will simulate vectoring aircraft arriving, departing and transitioning Minneapolis airspace. The student will build a workload from 2 aircraft on screen and increase this load up to around 20 aircraft.

Differentiation

Encouragement is given to students to explore their country of origin in regards to their history of aviation. It is important for those students to explore aviators, airplanes and aviation events of the country of which they were born.

Student with language difficulties will be catered for by providing them with either a "reader" or "writer"

Ethnic diverse populations will not be effected by this program.

Academic Language

Students will engage in using aviation jargon. They will use new technical words to supplement their language skills.

Resources

<u>Additions</u>