

## **SYLLABUS INTRODUCTION TO AVIATION**

**COURSE OBJECTIVE:** Upon successful completion of this course, the student will have a foundational understanding of all the aspects of flight presented in the modules. The student will also gain a broad knowledge of multiple aviation career pathways.

**COURSE DESCRIPTION:** Students will work through 10 modules covering a wide variety of aviation topics incorporating hands-on math and science. Each module will conclude with a “checkpoint” to evaluate the student’s understanding of the material.

Students will also be introduced to career pathways in the aviation industry through interviews with individuals who specialize in those areas. At the conclusion of the course students will understand major components of the aviation environment listed in the Modules section. They will also understand that there are many opportunities relating to aviation besides being a pilot. All classes will be online. The students will be able to work at their own pace and in their own time frame. Av-STEM instructors will be readily available for consultation via email ([takeoff@av-stem.com](mailto:takeoff@av-stem.com)), or by phone. Note: the preferred method is by email.

**COURSE GOALS:** Students will work through 10 modules covering a wide variety of aviation topics incorporating hands-on math and science. Each module will conclude with a “checkpoint” to evaluate the student’s understanding of the material.

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**COURSE POLICIES:** It is important that students follow the order of classes as presented in the syllabus. It should also be noted that we do not assign homework but allow class time to do the required assignments. Students will be expected to accomplish all assignments as presented in the course materials.

Parents and schools are responsible to use the grading tools available to assign their student a grade. It is the responsibility of the school or parent to keep all grade records.

**INSTRUCTORS:** Grant Funk and Barney Funk can both be reached via email at [takeoff@av-stem.com](mailto:takeoff@av-stem.com). We will also arrange a phone call if needed through email correspondence. Grant is a Certified Flight Instructor and Barney is a pilot as well as a certified Airframe and Power Plant Mechanic with an FAA Inspector Authorization. Grant and Barney are co-developers of this course.

**PROVIDED SUPPLIES:** Flight simulator software, aviation plotter, E6B flight computer (similar to a slide rule for flight calculations), and aviation charts. Please note: We do not provide the computer or the joystick to run the flight simulator. We recommend the Logitech Extreme 3D Pro joystick.

**ATTENDANCE:** Since this is an online course students are expected to take every class in the course as well as complete all class assignments. It is at the student's own time and pace.

**CLASSES:** Classes will be approximately 55 minutes in length which includes 5 minutes to gather supplies and 5 minutes to put supplies away.

**ASSIGNMENTS:** All assignments will be given and explained in class. There will be class time allotted to complete the assignments.

**GRADING:** Parents and schools will make the decision how the student grades will be recorded to best reflect their personal requirements. We recommend all assignments and checkpoint quizzes be evaluated as a part of the grade.

**COURSE OUTLINE AND DESCRIPTION.** (Note: Some modules will by necessity overlap to best accomplish student proficiency.)

1. **INTRODUCTION:** We introduce students to the instructors as well as the pathway to successful completion of their goals. Students will develop posters depicting the things that will destroy their dreams or bring them to life.
2. **AVIATION HISTORY:** The flying we enjoy today did not happen overnight. We will trace several significant scientific contributions throughout history that have brought us into the space age. This will not be a comprehensive study. That would be a very long course in itself. However, we enjoy the privilege of standing on the shoulders of many past scientists. Having an understanding of where we have come from will give students a good foundation to build on as we move forward. At the conclusion of this module students will develop an aviation time line from their notes and personal study.
3. **INTRODUCTION TO AERODYNAMICS:** We will explore the various theories of lift with special attention given to Bernoulli's Principle and Newton's Third Law of Motion. Students will participate in hands-on lifting force demonstrations.
4. **INTRODUCTION TO FLIGHT SIMULATOR:** Students will download and set up their flight simulator as well as learn some basic skills needed throughout the course. Flight simulator will be a learning tool and not a toy. This is an important concept that must be kept before the students to allow them to gain proficiency in the skills of flight. Students will develop the flying skills in this module to allow them to accomplish the flight simulator assignments in coming modules.
5. **AVIATION CHARTS:** Students will understand the longitude/latitude system, the chart legend, and the geographical features depicted on the charts. They will become proficient in the use of charts and will be using them throughout the course.
6. **NAVIGATION:** The charts and instruments will be utilized to navigate through the Alaska wilderness. Students will become comfortable in their navigation skills as they gain a solid understanding of the tools that are available for them to use. They will also

be flying in many of the unique geographic areas of Alaska giving them a virtual tour of the state as they do their assignments.

7. **FLIGHT CALCULATIONS:** The focus of this module will be on understanding the time, distance, and fuel needs of an airplane. Students will be taught to calculate these with and without a flight computer. Students will also be taught to use the flight computer to calculate wind correction angles. This module will lay the foundation for all the complexities of aviation math the student will be utilizing throughout the course.
8. **AIRCRAFT INSTRUMENTS:** Students will learn the main instruments of an airplane, the systems that run those instruments, and how redundancy is built into the instrument panel for safety. The flight simulator will be utilized to demonstrate the instruments.
9. **AVIATION WEATHER:** Students will understand how to read basic aviation weather charts. They will understand the interaction of high pressure and low pressure systems as well as how to identify and interpret cloud activity. This module will be multiple hands on experiments allowing students to see how warm air masses and cold air masses interact with each other. Students will begin to practice weather forecasting.
10. **PREDICTING FLIGHT PERFORMANCE:** Students will use the flight simulator to understand airplane performance. They will understand how glide speed affects glide distance and how density altitude and wing area affect take-off performance.
11. **WEIGHT AND BALANCE:** Weight and balance are critical to every area of flight. At the completion of this module, students will be able to calculate the weight and balance of an airplane.

**CAREER PATHWAYS:** There are more aviation career opportunities available than can be covered in this course. We do, however, introduce the students to a variety of ways airplanes are used. We also introduce the students to career opportunities that do not necessarily involve flying the airplane. This is accomplished by interviewing people that are actually involved in these careers or opportunities. In general, we have scheduled career pathway interviews about once every 5 classes beginning in the Aerodynamics Module. There are approximately 30 career pathway interviews throughout the entire course.

**PERSONAL COMMITMENT:** We are committed to being as available to our students as possible. We will respond promptly to emails and/or voice messages.