

## TWELFTH GRADE CURRICULUM: PILOT

### PREFLIGHT YOUR CAREER

#### SEMESTER ONE

After having prepared for the Private Pilot Knowledge Test and Part 107 Remote Pilot Test in the previous year, students will examine advanced aviation topics and aviation career options. Instrument flight, commercial aviation, and advanced aircraft systems begin the semester. Looking into the future, students then explore new horizons in the aerospace industry. What might aviation look like five, ten, or twenty years into the future? The focus then turns to business development opportunities in aviation. Finally, students learn about and conduct different types of research in preparation for their capstone project in the second semester.

#### Unit 1: Advanced Aviation

The sky's the limit for students seeking to advance their aviation knowledge and skills or pursue a career in an aviation-related field. This unit introduces students to what's beyond the private pilot certificate. How do pilots fly in weather that is below VFR minimums? Instrument flying is introduced in Section A. What types of flying jobs are available to pilots? Is it possible to pursue a career in aviation that is not a flying job? Students explore career possibilities while honing their employer research and interviewing skills. Commercial pilots need an in-depth knowledge of advanced aircraft and their systems; Section C allows students to become experts in various aircraft systems.

		No. of Sessions Per Lesson	Day of Semester
<u>Pre-Course Exam</u>		1	1
<u>Section A – Instrument Flight</u>			
Lesson 1	What is an Instrument Rating?	1	2
Lesson 2	Attitude Instrument Flying	3	5
Lesson 3	En Route Navigation	3	8
Lesson 4	Getting Down with Approaches	2	10
Lesson 5	Flying on Instruments	3	13
<u>Section B – Commercial Aviation</u>			
Lesson 1	What is a Commercial Pilot Certificate?	1	14
Lesson 2	Do I Have to Be an Airline Pilot?	4	18
Lesson 3	Soft Skills for a Soft Landing	2	20
<u>Section C – Advanced Aircraft Systems</u>			
Lesson 1	Stepping up to Advanced Aircraft	1	21
Lesson 2	Understanding Advanced Systems	3	24

Unit 1 Exam

1

25

**Total Sessions Unit 1 25****Semester Total 25****Unit 2: The Future of Aviation**

Aviation and aerospace have been technology incubators from their beginnings in the 1900s, but what does the future hold? In this unit students investigate new companions in the National Airspace System: unmanned aircraft. How will the next generation of aircraft—even spacecraft—affect the career paths of today's students? What technological innovations and dreams of today will become the everyday of tomorrow?

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – The World of UAS</u>			
Lesson 1	Drones and Their Missions	1	27
Lesson 2	Commercial UAS from the Ground Up	2	29
Lesson 3	Remote Possibilities	2	31
<u>Section B – Aerospace Segments to Watch</u>			
Lesson 1	Aviation Innovations Big and Small	1	32
Lesson 2	From Looking at Stars to Living on Mars	1	33
Lesson 3	Science Fiction to Aerospace Reality	5	38

*There is no exam for Unit 2.*

**Total Sessions Unit 2 12****Semester Total 37**

**Unit 3: The Business of Aviation**

In Unit 3, students will learn about the intersection between the disciplines of aviation and business, and how entrepreneurs—after perceiving a new opportunity—go about making their ideas a reality. Within this practical and highly differentiated unit, students will have the opportunity to come up with an aviation-related start-up idea either on their own or with a partner, and to then create a business plan that will allow them to develop it. Whether deciding to open a new flight school or FBO, charter company or UAS photography business, students will craft a plan that describes their business's mission, as well as an analysis of its customers and the competitive environment in which it will exist. Other elements typically found in business plans, such as a risk analysis and start-up budget, will also be prepared. Finally, students will use their business plans as a launching point to prepare convincing pitches for potential investors. During this project, students are encouraged to make contacts with local business owners, both to seek advice and to gain unique insights into real-world entrepreneurship.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – A Plan for Success</u>			
Lesson 1	Aviation Business Entrepreneurs	3	40
Lesson 2	Elements of a Business Plan	4	44
Lesson 3	Pitching for Success	8	52

*There is no exam for Unit 3.*

**Total Sessions Unit 3**    **15**  
**Semester Total**        **52**

**Unit 4: Aviation Research Projects**

The fourth and final unit of Semester One is intended to prepare students for Semester Two—in which they will be developing their capstone projects. Within this unit, students will be choosing an aviation-related topic that interests them and crafting a research proposal outlining a potential line of study they could pursue in Semester Two. In doing this, students will become familiar with important elements commonly found within research proposals, such as a literature review and a methodology section. They will also learn about important distinctions between qualitative and quantitative research, and appropriate contexts for both. Other research-related skills, including effective notetaking and time management techniques, will be looked at as well. Going through the process of creating a research proposal and presenting it to their classmates will help students explore research methods while also becoming more familiar with a topic that interests them.

		No. of Sessions Per Lesson	Day of Semester
<b>Section A – Crafting a Proposal</b>			
Lesson 1	Choosing a Research Topic	2	54
Lesson 2	Creating an Annotated Bibliography	3	57
Lesson 3	Qualitative versus Quantitative Research	3	60
Lesson 4	Literature Review	3	63
Lesson 5	Methods of Investigation	3	66
Lesson 6	Pulling It All Together	3	69
<i>There is no exam for Unit 4.</i>			
<u>Post-Course Exam</u>		1	70
<b>Total Sessions Unit 4</b>	<b>18</b>		
<b>Semester Total</b>	<b>70</b>		

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### PILOT CAPSTONE

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#### SEMESTER TWO

The Pilot capstone course is the culmination of the student's learning experience throughout this pathway. The students will work as individuals or in small groups to study and report on an approved aviation topic of their choosing. The goal of this capstone course is to allow students to demonstrate an understanding of a contemporary topic in aviation as it relates to flying. The curriculum will include suggestions for research topics or projects that can be adapted to match available resources.

#### Unit 5: What is a Capstone?

The concept and scope of a capstone project is introduced. Students begin by reflecting on their research proposal from the end of the first semester, their past experiences, and lessons learned in preparation for this semester's project. Their experiences will help them build a list of stackable credentials. Students will be asked to secure a bound, composition book or engineering notebook to act as a legal document to be a record of their work this semester. Students are also introduced to time management principles, project management practices.

The concept of research being something beyond a typical term paper is emphasized, and students learn the importance of research as intellectual property. Research design, methods, and approaches are reviewed and expanded upon from those introduced in the first semester. Finally, students determine the topic they wish to present in their research proposal.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – The Capstone Experience</u>			
Lesson 1	What is a capstone?	2	2
Lesson 2	Managing the capstone: Time management	2	4
<u>Section B – Research Methodologies</u>			
Lesson 1	Research as intellectual property	1	5
Lesson 2	Educational research	4	9
Lesson 3	Exploring topics for the research proposal	2	11
Performance assessment		1	12
<b>Total Sessions Unit 1</b>		<b>12</b>	
<b>Semester Total</b>		<b>12</b>	

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### Unit 6: The Research Proposal

Students were introduced to the concept of the research proposal at the end of their first semester. This unit continues that thread, deepens their understanding of the research proposal development process and provides an opportunity for the students to plan their capstone project in detail.

Students also refine their professional “soft skills” as they prepare to engage with mentors, enter workplaces, network with those in their field of interest, and communicate with their contacts. Any expenses they may incur should be planned, and a budget for the project is developed.

Pitching any project proposal is an important skill, and the students will have practice in this area as they develop and present their pitch.

The overall plan is documented in the research notebook and presented for assessment.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – The Research Professional</u>			
Lesson 1	Refining your topic	1	13
Lesson 2	Professionals in the field	4	17
Lesson 3	Develop and present your budget	2	19
<u>Section B – Defending the Formal Proposal</u>			
Lesson 1	Developing a pitch	1	20
Lesson 2	Presenting the pitch	3	23
Performance Assessment		1	24
<b>Total Sessions Unit 6</b>		<b>11</b>	
<b>Semester Total</b>		<b>24</b>	

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### Unit 7: Collecting the Data

In Unit 7, students engage in their work to complete their capstone project. This may entail conducting surveys, engaging in an internship, participating in an apprenticeship, or other activity appropriate to the successful completion of their project.

At this stage, students are working independently, sharing progress regularly with the teacher, meeting with mentors, documenting and recording their progress, and deciphering data they have collected.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – The Capstone Project</u>			
Lesson 1	Identifying valid and appropriate data	1	25
Lesson 2	Research in action	17	42
Lesson 3	Deciphering the data	8	50
Performance Assessment		2	52
<b>Total Sessions Unit 3</b>	<b>28</b>		
<b>Semester Total</b>	<b>52</b>		

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### Unit 8: Research and Data Analysis

After collecting data from their capstone project research, students compile the data and create visualizations that effectively communicate their experience. They also develop a written research project report as well as a presentation to be delivered in the next unit.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – The Research Paper</u>			
Lesson 1	Visualizing the data	4	56
Lesson 2	Communicating the results	3	59
Performance Assessment		1	60
<b>Total Sessions Unit 4</b>	<b>8</b>		
<b>Semester Total</b>	<b>60</b>		



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### Unit 9: Communicating the Findings

The semester ends with an event developed by the students that will allow them to share their capstone projects with peers, families, mentors, community members, teachers, etc. Time is given for planning, practicing, and presenting the event and their work.

A semester assessment may include the final presentation event; however, a presentation of artifacts to mentors, conducting interviews, and sending professional thank you notes to contacts may also be included. Additionally, the completed research document and completed research notebook may be submitted for assessment.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – The Research Paper</u>			
Lesson 1	Cleared for takeoff	5	65
Lesson 2	Taking flight	3	68
Performance Assessment		2	70
<b>Total Sessions Unit 4</b>	<b>8</b>		
<b>Semester Total</b>	<b>60</b>		