



ELEVENTH GRADE CURRICULUM: UAS

UAS OPERATIONS

SEMESTER TWO

This course will cover small unmanned aircraft performance, ethics, human factors, aeronautical decision-making and judgment, safety protocols, weight and balance, maintenance, aviation weather sources and effects of weather (micro-meteorology) on small unmanned aircraft performance, small unmanned aircraft loading and performance, emergency procedures, crew resource management, and preflight inspection procedures. Students will be provided the opportunity to participate in multiple practice examinations. Students will be prepared to complete the Federal Aviation Administration's Part 107 Remote Pilot Knowledge Test upon completion of this course.

Unit 6: Introduction to Drones and UAS Operations

In Unit 6, students will receive a broad overview of the world of unmanned flight, and a preview of what is to come in the course. This will include a first look at common UAS components, and an explanation of how different types of drones fly. Next, students will learn about Part 107: the types of flying it applies to, the certification process, and the regulations with which commercial drone operators must be familiar. Finally, students will look beyond Part 107 at privacy issues that have arisen with the popularity of drones, as well as best practices remote pilots should follow to be good neighbors.

	No. of Sessions Per Lesson	Day of Semester
<u>Pre-Course Exam</u>	1	1
<u>Section A – Drones and their Components</u>		
Lesson 1 Introduction to UAS	2	3
Lesson 2 How Drones Fly	3	6
<u>Section B - Part 107 and Beyond</u>		
Lesson 1 Part 107: An Introduction	2	8
Lesson 2 Part 107: Operating Rules and Waivers	3	11
Lesson 3 Beyond 107: Best Practices and Being a Good Neighbor	2	13
<u>Unit 6 Exam</u>	1	14
Total Sessions Unit 6	14	
Semester Total	14	

**Unit 7: Operational Decision Making**

In Section A of Unit 7, students will learn ways in which topics they have been introduced to before, such as weather theory and aerodynamics, relate specifically to sUAS operations. Next, in Section B, they will continue to learn how effective crew management is essential to these operations. Students will learn both regulatory requirements and best practices for preflight inspections and drone maintenance, and how crew resource management plays a vital role in UAS missions. At the close of the unit, students will look at how to handle common UAS emergencies, as well as the various human factors involved in UAS flight.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – Weather and Performance</u>			
Lesson 1	Practical Weather for UAS Pilots	3	17
Lesson 2	Small UAS Loading	2	19
Lesson 3	UAS Aerodynamics and Performance	3	22
<u>Section B – UAS Crew Management</u>			
Lesson 1	Preflight and Maintenance	3	25
Lesson 2	UAS Crew Resource Management and Communications	3	28
Lesson 3	Handling Emergencies	3	31
Lesson 4	Human Factors and ADM	4	35
<u>Unit 7 Exam</u>		1	36
Total Sessions Unit 7		22	
Semester Total		36	



Unit 8: Becoming a Commercial sUAS Pilot

In this unit, students will revisit topics that they learned in the first semester of 11th grade, including airspace and navigation, airport operations, radio communications, and weather theory. These are topics that don't apply to sUAS exclusively, but are necessary for all pilots. For the review, students will divide into groups and research the various topics, and then each group will find a creative way to teach the class the material. At the end of Unit 8, students will be prepared to take the FAA's Part 107 exam and earn their commercial sUAS certification.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – Part 107 Exam Preparation</u>			
Lesson 1	Group Project: Your Turn to Teach Regulations Airspace and Requirements Weather Loading and Performance Operations	10	46
Lesson 2	UAS Jeopardy!	1	47
	<u>Unit 8 Practice Exam (Optional)</u>	0	47
Total Sessions Unit 8	11		
Semester Total	47		



Unit 9: From Theory to Practice: Planning and Executing a Mission

Unit 9, as its title suggests, will give students a chance to apply the knowledge they've learned in the course by learning to fly drones and taking part in simulated sUAS operations. The unit will begin with an in-depth look at the systems involved in UAS, including controllers, propulsion, and electrical systems. Next, students will learn about different types of drone imaging sensors. After covering important aspects of UAS safety, students will have opportunities to get hands-on experience flying a drone. In Section B, students will apply what they have learned throughout the semester to perform real-world sUAS operations as teams. Each team will work with a client (either their school or another local organization) to provide a beneficial product or service using a drone. This will give students the opportunity to plan an sUAS operation from the ground up, to fly it, and to present a valuable deliverable to a client—all of which are skills that they would use day to day as professional remote pilots.

		No. of Sessions Per Lesson	Day of Semester
<u>Section A – Flight School</u>			
Lesson 1	The Right Drone for the Job	2	49
Lesson 2	Expert Mode	4	53
Lesson 3	Learning to Fly: Fundamentals of Control	4	57
<u>Section B – Drones in Action</u>			
Lesson 1	Real-World Experience: UAS Team Operations	12	69
<u>Post-Course Exam</u>		1	70
Total Sessions Unit 9	23		
Semester Total	70		