

AiNautics



Air Innovations

Instructional Guide

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School Year: 2023-2024

Welcome to our new UAS Scholars Learning Management System (LMS)!

We are excited to introduce our new LMS platform, designed to enhance the teaching and learning experience for our UAS Scholars! This system will revolutionize how we engage with educational content, collaborate, and track student progress. By utilizing this powerful tool, we aim to provide an efficient and effective digital environment for educators, administrators, students, and parents.

To ensure a smooth transition and successful adoption of our LMS, we have created a comprehensive onboarding process for all district/school staff members. Below, you will find important details and instructions on how to get started:

1. Set up a day and time for LMS Virtual Orientation: This is a follow-up and feedback of your initial training and a refresher of the LMS to ensure you are confident with the platform's features and functionality, as well as provide you with strategies for integrating it into your daily teaching practice.
2. Create a spreadsheet for importing/enrolling students.
3. Once information has been added, you will receive an email upon the success of your registration.

We understand that adopting a new system can come with new challenges. Therefore, we have established a dedicated support team to assist you with any questions or issues you may encounter during the onboarding process.

Please contact Michele Heyward, for academic support. In addition, we are compiling a comprehensive set of resources including the LMS Instructional Manual and video tutorials, which will be access through the LMS platform.

AINautics believes that our LMS will empower you to deliver a more engaging and personalized learning experience for your students. By leveraging the platform's capabilities, we can foster collaboration, streamline workflows, and improve student outcomes.

Thank you for your dedication to providing exceptional education for your scholars! We look forward to the continued partnership!

Sincerely,

Michele Heyward

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Introduction:

Remote Pilot Certification is a crucial skill to have in today's world as it offers various opportunities and advantages to individuals. It involves learning how to operate and fly drones or unmanned aircraft systems (UAS) safely and responsibly. The Federal Aviation Administration (FAA) regulates the use of UAS, and obtaining a Remote Pilot Certificate is necessary to legally operate drones for commercial purposes. This instructional guide is designed to teach high school students how to obtain a Remote Pilot Certification using a Learning Management System (LMS).

Step 1: Introduction to Remote Pilot Certification- The first step is to introduce students to Remote Pilot Certification and its benefits. Explain to them what it is and the advantages of having this certification. Discuss the different types of UAS and their uses. Explain that obtaining a Remote Pilot Certificate is necessary for commercial use and is regulated by the FAA.

Step 2: FAA Regulations and Requirements- Next, educate students on the FAA regulations and requirements for obtaining a Remote Pilot Certificate. Provide an overview of the Part 107 regulations and the eligibility requirements, which include being at least 16 years old, being able to speak, read, write, and understand English, and passing an aeronautical knowledge test.

Step 3: Aeronautical Knowledge Test -Teach students about the aeronautical knowledge test, which is a required part of obtaining a Remote Pilot Certificate. Discuss the topics covered on the test, including airspace classification and operating requirements, emergency procedures, radio communication procedures, and UAS loading and performance. Explain the test format and provide sample questions to help students prepare for the test.

Step 4: LMS Learning -Using an LMS, provide students with access to learning materials and resources to prepare for the aeronautical knowledge test. Include videos, presentations, and interactive activities to help them understand the different topics covered on the test. Assign quizzes and practice tests to help students assess their learning progress and identify areas for improvement.

Step 5: Practical Flying Experience - After passing the aeronautical knowledge test, provide students with practical flying experience. Allow them to operate a drone under your supervision to help them understand the proper techniques and best practices for safe and responsible UAS operation. Provide hands-on learning opportunities that allow students to practice maneuvers and emergency procedures.

Step 6: Remote Pilot Certification Application -Once students have completed the required training and passed the aeronautical knowledge test, they can apply for a Remote Pilot Certificate through the FAA's online portal. Guide them through the application process, including completing the required forms, providing supporting documents, and paying the application fee.

Conclusion: By following the above steps, high school students can learn how to obtain a Remote Pilot Certificate using an LMS. This certification can open doors to various opportunities, including working in the drone industry, conducting research, or starting a business. It's a valuable skill to have in today's world, and the training provided can prepare students for safe and responsible UAS operation.

Sample Course Syllabus:

COURSE TITLE: Remote Pilot Certification for High School Students

COURSE DESCRIPTION: This course provides high school students with the knowledge and skills necessary to obtain a remote pilot certificate from the Federal Aviation Administration (FAA) in accordance with the regulations outlined in 14 CFR Part 107. Students will learn about airspace classification, weather, performance, emergency procedures, and regulations as they relate to unmanned aerial systems (UAS). The course also covers ethical and safety considerations when operating a UAS.

PREREQUISITES: None

COURSE OBJECTIVES:

- Understand the principles of flight and how they apply to UAS
- Understand and apply FAA regulations for commercial drone operations
- Understand the weather and environmental factors affecting UAS operations
- Demonstrate proficiency in UAS operations and emergency procedures
- Develop skills in risk management and safety considerations when operating UAS

TEXTBOOKS AND MATERIALS:

- Remote Pilot Test Prep 2023 Study & Prepare: Pass your test and know what is essential to safely operate an unmanned aircraft – from the most trusted source in aviation training (ASA Test Prep) by ASA Test Prep Board which includes the Testing Supplement (Red Book)
- DIY Kits, TELLO Drones, DJI Mini-Mavericks

ASSESSMENT:

- Knowledge quizzes and exams (40%)
- Projects (40%)
- Final project (20%)
-

COURSE OUTLINE:

Unit 1: Introduction to UAS and the FAA (Week 1-2)

- Introduction to UAS
- Overview of Part 107 regulations
- FAA requirements for UAS operations
- FAA resources for UAS operators
- Register for FTN and PSI
- **Suggested Project:** DIY Team Project (See LMS Student Activities)

Unit 2: Airspace Classification and Operating Requirements (Weeks 2-3)

- Airspace classification and requirements for UAS operations
- Understanding NOTAMs and TFRs
- Airspace authorizations and waivers
- **Suggested Project(s):** Airspace Individual Project, Airspace Group Project (See LMS Student Activities)

Unit 4: Weather and Environmental Factors (Weeks 4-5)

- Understanding weather and environmental factors affecting UAS operations
- Effects of temperature, wind, and precipitation on UAS operations
- Mitigating risks associated with weather
- Suggested Project: Weather Project (See LMS Student Activities)
- **Suggested Activity:** Flight Time

Unit 5: Pre-Flight Considerations (Week 6)

- Basic UAS operations
- Emergency procedures and contingencies
- Developing a risk management plan
- **Suggested Activity:** Flight Time

Unit 6: Operations (Week 7)

- Ethical considerations for UAS operations
- Safety considerations and best practices
- FAA enforcement actions
- **Suggested Activity:** Flight Time

Unit 7: Review and Exam Preparation (Weeks 8)

- Review of course material
- Practice exams and quizzes
- Final project

FINAL PROJECT/FLIGHT TIME: (Week 9)

For the final project, students will create a comprehensive risk management plan for a UAS operation. The plan should include a detailed analysis of potential risks, strategies for mitigating those risks, and a step-by-step procedure for dealing with emergency situations. The plan should also take into consideration ethical and safety considerations as well as compliance with FAA regulations. Students will present their plans to the class and receive feedback from their peers and the instructor.

Note: Factor in Flight Time:

GRADING SCALE:

90-100% A

80-89% B

70-79% C

60-69% D

Below 60% F

Sample Pacing Guide:

Week 1-2: Introduction to Remote Pilot Certification

- Overview of the course and syllabus
- Introduction to FAA regulations and requirements
- Basics of flying and aviation safety

Week 3-4: Airspace

- Understanding different types of airspace
- Understanding how to read sectional charts
- Operating in different airspace classifications
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Week 5-6: Weather

- Understanding how weather affects flight operations
- Interpretation of weather reports and forecasts
- Safe decision making based on weather conditions

Week 7: Pre-Flight Considerations

- Understanding aircraft performance parameters
- Calculating performance data for different flight operations
- Performance limitations and considerations

Week 8: Operations

- Operations in different environments such as airports, urban areas, and rural areas
- Operating procedures and considerations
- Emergency procedures and safety management

Week 9: Navigation

- Understanding navigation systems
- Planning a flight
- Navigation during flight

Week 10: Communication

- Communication requirements for safe flight operations
- Understanding communication protocols
- Radio communication procedures

Week 11: Human Factors

- Understanding the effects of fatigue, stress, and other human factors on pilot performance
- Decision making in stressful situations
- Crew resource management

Week 12: Review and Exam Preparation

- Review of course materials

- Practice exam questions and simulations
- Exam preparation strategies

LMS Curriculum

Unit 1: Regulations

- Lesson 1 - General
- Lesson 1.2 - Operating Rules
- Lesson 1.3 - Remoter Pilot Certificate with an sUAS Rating
- Lesson 1.4 - Waivers
- Lesson 1.5 - Operations over People
- Lesson 1.6 - Remote Identification (RID)

Supplemental Activities: Regulations Journal Activity, Reading the Legend Exercise

Unit 2: Airspace Classification

- Lesson 2.1 - Airspace Classification
- Lesson 2.2 - Airspace Operational Requirements

Supplemental Activities: Latitude & Longitude Exercise Airspace Classifications Unit Project, Group Project

Unit 3: Weather

- Lesson 3.1 - Sources of Weather
- Lesson 3.2 - Effects of Weather on Performance

Supplemental Activities: Weather Journal Assignment, METAR/TAF Exercise

Unit 4: Pre-Flight Considerations

- Lesson 4.1 - Loading and Performance

Supplemental Activities: Regulations Journal Activity

Unit 5: Operations

- Lesson 5.1 - Radio Communications
- Lesson 5.2 - Airport Operations
- Lesson 5.3 - Emergency Procedures
- Lesson 5.4 - Aeronautical Decision Making

Supplemental Activities: Operations/Airport Exercise



Instructional Resources

1. Aeronautical Charts: <https://skyvector.com/>
2. Google Earth: <https://earth.google.com/web/>
3. **B4UFLY**: Find that on your phone: Android or Apple
4. METAR-TAF: <https://metar-taf.com/>

Suggested Drone Pre-Flight Checklist

1. **Check the weather conditions:**

- Ensure that the wind speed is within the safe limits specified by the drone manufacturer.
- Avoid flying in rainy or stormy conditions.
- Be mindful of any local regulations or restrictions related to weather conditions.

2. **Location selection:**

- Choose a suitable and legal area for flying the drone, such as a park or open field.
- Make sure there are no obstacles like trees, buildings, or power lines nearby.

3. **Verify drone condition:**

- Inspect the drone for any physical damage, loose parts, or malfunctions.
- Ensure that the propellers are securely attached.
- Check the battery level and make sure it is adequately charged.

4. **Verify controller condition:**

- Check the battery level of the controller and charge it if necessary.
- Ensure that the controller is functioning properly and all buttons and joysticks are responsive.

5. **Set up the flight area:**

- Clear the takeoff and landing area of any debris or obstructions.
- Set up any necessary markers or boundaries for maintaining a safe flying distance.

6. **Calibrate the drone (if required):**

- Follow the manufacturer's instructions to calibrate the drone's compass, gyroscope, and accelerometer.
- *Note: This step may not be necessary for all drone models, but if it is, it helps ensure stable flight.*

7. **Prepare the flight plan:**

- Determine the flight path and areas of interest in advance.
- Take note of any no-fly zones or restricted areas in the vicinity.

8. **Ensure personal safety:**

- Dress appropriately, considering the weather and any potential hazards.
- Wear safety glasses to protect your eyes from debris.
- Keep a safe distance from the drone during takeoff and landing.

9. **Check for bystanders:**

- Make sure there are no people or animals in the immediate vicinity who could be endangered by the drone's flight.

10. Fly responsibly:

- Familiarize yourself with local regulations and follow them strictly.
- Maintain visual line of sight with the drone at all times.
- Avoid flying near airports, helipads, or other aircraft.
- Respect privacy and avoid recording or flying over private property without permission.

11. Perform pre-flight test maneuvers:

- Conduct a short test flight to check the drone's stability, responsiveness, and camera functionality.
- Verify that all flight modes (such as GPS mode, manual mode, etc.) are working correctly.

12. Monitor battery levels:

- Keep an eye on the drone's battery level during flight.
- Plan your flight duration accordingly to ensure a safe return to the landing area with sufficient battery remaining.

13. Post-flight inspection:

- Once the flight is complete, inspect the drone for any damage or abnormal behavior.
- Securely store the drone and controller in a safe place until the next flight.

Remember, safety should always be the top priority when flying a drone. Following this checklist will help ensure a successful and responsible drone flight experience.