EET-1250: FAA DRONE CERTIFICATION TEST PREPARATION

Cuyahoga Community College

Viewing: EET-1250 : FAA Drone Certification Test Preparation

Board of Trustees:
2018-05-24

Academic Term:
Fall 2018

Subject Code
EET - Electrical/Electronic Engineer

Course Number:
1250

Title:
FAA Drone Certification Test Preparation

Catalog Description:
This course prepares students for the Federal Aviation Administration's (FAA) drone certification test.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
None.

Outcomes

Course Outcome(s):
Demonstrate regulatory requirements of the remote pilot - Small unmanned Aircraft Systems (sUAS) Certificate standards (14 CFR part 107).

Objective(s):
1. Discuss the applicability of 14 CFR part 107 to sAUS.
2. Explain the definitions used in 14 CFR part 107.
3. Discuss the ramifications for falsifying, reproducing, or altering a certificate, rating, authorization, record or report.
4. Discuss the procedure for accident reporting.
5. Demonstrate inspection and testing necessary for certification compliance.

Course Outcome(s):
Explain Radio Communications Procedures.

Objective(s):
1. Explain airport operations with and without an operating control tower.
2. Explain and describe the use of Common Traffic Advisory Frequency (CTAF) to monitor manned aircraft communications.
3. Explain traffic advisory procedures used by manned aircraft pilots such as self-announcing of position and intention.
4. Explain aeronautical advisory communications station (UNICOM) and associated communication procedures used by manned aircraft pilots.
5. Explain Automatic Terminal Information Services (ATIS).
6. Explain aircraft call signs and registration numbers.
7. Demonstrate the phonetic alphabet.
8. Explain phraseology concerning altitudes, directions, speed, and time.

Course Outcome(s):

Explain airport operations.

Objective(s):

1. Explain the types of airports, such as towered, uncontrolled towered, heliport, and seaplane based.
2. Explain ATC towers, such as insuring the remote pilot can monitor and interpret ATC communications to improve situational awareness.
3. Explain runway marking and signage.
4. Explain traffic patterns used by manned aircraft pilots.
5. Explain Security Identification Display Areas (SIDA).
6. Explain the sources for airport data.
7. Explain the need to avoid bird and wildlife hazards and the procedure for reporting collisions between aircraft and wildlife.

Course Outcome(s):

Explain emergency procedures.

Objective(s):

1. Provide examples of emergency planning and communications.
2. Explain the characteristics and potential hazards of lithium ion batteries.
3. Explain the loss of aircraft control link and fly-aways.
4. Explain the Loss of Global Positional System (GPS) signal during flight and possible consequences.
5. Explain the frequency spectrum and associated limitations.

Course Outcome(s):

Explain the need for and use of aeronautical decision making.

Objective(s):

1. Explain Aeronautical Decision Making (ADM).
2. Explain Crew Resource Management (CRM).
3. Explain situational awareness.
4. Explain hazardous altitudes.
5. Explain hazard identification and risk assessment.

Course Outcome(s):

Explain maintenance and inspection procedures.

Objective(s):

1. Explain basic maintenance.
2. List pre-flight inspection.
3. Explain techniques to mitigate mechanical failures of all elements used in sUAS operations, such as battery and/or any devices used to operate the sUAS.
4. Explain appropriate record keeping.
5. Explain the requirement of persons that may perform maintenance on an sUAS.

Course Outcome(s):

Explain ground stations and their purpose.

Objective(s):

1. Explain waypoints on a map or GPS system.
2. Explain establishing a flight path.
3. Explain monitoring and recording a flight.

Course Outcome(s):

Explain possible profitable uses of sUAS.

Objective(s):

1. Explain possible uses in agriculture, architectural and construction, emergency services, engineering, environmental monitoring, and conservation.

2. Explain possible uses in business enterprises that include drones-as-a-service, media uses for broadcasting, training, and wireless internet access.

Course Outcome(s):

Explain quadcopter flying techniques.

Objective(s):

1. Explain quadcopter controls and components.
2. Demonstrate hovering, flying in a circle, and rotating a quadcopter.
3. Explain beginner and advanced flying techniques.

Course Outcome(s):

Demonstrate the operating rules of 14 CFR part 107, the registration rules of 14 CFR parts 47 and 48, and other associated operating requirements.

Objective(s):

1. Explain what may be considered hazardous operation of an sUAS.
2. Explain additional concerns and areas of unsafe operation if an sUAS is operated from a moving car or boat.
3. Explain the regulatory consequences if flying an sUAS while under the influence of alcohol or drugs.
4. Explain the advantages of daylight operations and Visual Line of Sight (VLOS) aircraft operations.
5. Explain the rules regarding the operation of multiple sUAS.
6. Explain the rules regarding carrying hazardous material on an sUAS.
7. Explain the rules regarding distance from other aircraft and right-of-way rules.
8. Explain the rules and concerns regarding flight over humans.
9. Determine and explain why authorization is necessary for flying in certain airspaces.
10. Explain the rules regarding the operation of sUAS around airports.
11. Explain restrictions regarding flying in proximity to certain areas designated by a Notice to Airmen (NOTAM).
12. Explain why operation near an airport is prohibited.
13. Explain the operating limitation of an sUAS; for example, height.
14. Explain the general requirements for a Remote Pilot Certificate with an sUAS rating.
15. Explain registration requirements for an sUAS.
16. Explain conditions required for the safe operation of an sUAS.
17. Explain any medical conditions that might interfere with the safe operation of an sUAS.
18. Explain regulatory deviation requirements for in-flight emergencies.

Course Outcome(s):

Determine the regulations for a Remote Pilot Certification with an sUAS rating.

Objective(s):

1. Explain the consequences for operating an sUAS while under the influence of alcohol or drugs.
2. Explain the consequences for refusing to submit to a drug or alcohol test or to furnish test results.
3. Explain the eligibility requirements for a Remote Pilot Certificate with an sUAS rating.

Course Outcome(s):

Explain the use of regulation waivers.

Objective(s):

1. Explain the waiver policy.
2. Explain waiver requirements.

Course Outcome(s):

Explain airspace classification.

Objective(s):

1. Explain general airspace and any restrictions that may apply.
2. Explain special-use airspace, such as prohibited, restricted, warning area, military operation areas, alert areas, and controlled firing areas.
3. Explain other air spaces, such as prohibited, restricted, warning areas, military operation areas, Temporary Flight Restrictions (TFRs), parachute jump operations, Terminal Radar Service Areas (TRSAs), National Security Areas (NSA), and Visual Flight Rules (VFR) routes.

Course Outcome(s):

Explain aspects of Airspace Operational Requirements.

Objective(s):

1. Explain basic weather minimums.
2. Explain Air Traffic Controller (ATC) authorizations and related operating limitations.
3. Explain restraints when operating near an airport.
4. List potential flight hazards.
5. Explain the NOTAM system including how to obtain an established NOTAM through Flight Service.

Course Outcome(s):

Explain the various sources of weather information.

Objective(s):

1. Explain the use of internet weather briefing and sources of weather available for flight planning purposes.
2. Explain Routine Aviation Weather Reports (METAR) and Terminal Aerodrome Forecasts (TAF).
3. Explain weather charts.
4. Explain Automated Surface Observing Systems (ASOS) and Automated Weather Observing Systems (AWOS).

Course Outcome(s):

Explain the effects of weather on a sUAS.

Objective(s):

1. Explain density altitude, wind and currents, atmospheric stability including pressure and temperature, air masses and fronts, thunderstorms and microbursts, tornadoes, icing, hail, fog, ceiling and visibility, and lightning.
2. Explain the effects of weather on sUAS performance.

Course Outcome(s):

Explain sAUS loading and performance.

Objective(s):

1. Explain general loading and how it affects performance.
2. Explain the importance and use of performance data in predicting the effects of loading on the performance of sUAS.

Methods of Evaluation:

1. Test and quizzes
2. Lab experiments including flying
3. Written reports
4. Homework
5. Programming assignments

Course Content Outline:

1. Regulatory requirements
    a. Overview of the FAA
    b. FAA's area of responsibility
    c. Rule compliance
        i. Inspection of aircraft
        ii. Testing of aircraft
    d. Accident reporting
        i. Time limit
        ii. Type of accidents that require reporting
    e. Falsifying documents and ramifications
        i. Altering a certificate
        ii. Altering a rating
        iii. Altering an authorization
        iv. Altering a report
2. FAA operating rules for sUAS

   a. Registration requirements
      i. Who must register
      ii. Consequences for not registering
   b. Safe operation of a sUAS
      i. Medical conditions
      ii. Weather conditions
      iii. Hazardous operation
      iv. Under the influence of banned substances
   c. Safety rules
      i. Carrying hazardous material
      ii. Right-of-way rules
      iii. Flying over people
      iv. Authorization for flight near an airport
      v. Authorization to fly in certain airspace
      vi. Distance from other aircraft
      vii. Height restrictions
   d. Waivers for rules
      i. Waver policy
      ii. Waiver requirements
3. Airspace classification
   a. Check for special use restrictions
      i. Prohibited
      ii. Restricted
      iii. Warning area
      iv. Military
      v. Alert area
      vi. Controlled firing areas
4. Operational requirements
   a. Weather minimums
   b. Potential; flight hazards
   c. Daylight versus night operations
   d. Line-of-sight
   e. NOTAM system
5. Weather
   a. Weather briefings
   b. Sources of weather information
   c. Flight plan
   d. Route Aviation Weather Reports
   e. Terminal Aerodrome Forecasts
   f. Weather charts
   g. Automated Surface Observing Systems
   h. Automated Weather Observing Systems
6. sUAS performance
   a. Effects of weather
      i. Density altitude
      ii. Wind and currents
      iii. Atmosphere stability
         1. Barometric pressure
         2. Temperature
         3. Air masses and fronts
         4. Thunderstorms
         5. Micro bursts tornadoes
         6. Icing
         7. Hail
         8. Fog
         9. Ceiling
         10. Visibility
         11. Lightning
   b. Loading

    i. Loading Versus sUAS specification
    ii. Predicting loading with regard to weather
7. Radio Communications
    a. With a control tower
    b. Without a control tower
    c. Common Traffic Advisory Frequency
    d. Self-announcing position and intension
    e. Automatic Terminal Information Services
    f. Call signs
    g. Registration numbers
    h. Phonetic alphabet
    i. Phraseology
8. Emergency procedures
    a. Emergency planning
    b. Emergency communications
    c. Loss of aircraft control link
    d. Fly-aways
    e. Lithium ion batteries
    f. Limitations of the frequency spectrum
    g. Loss of GPS
9. Maintenance and inspection
    a. Basic maintenance
    b. Preflight inspection
    c. Mitigating failures
        i. Mechanical
        ii. Electrical / battery failure
    d. Record keeping
    e. Credentials necessary to perform maintenance
10. Emerging technology
    a. Uses in agriculture
    b. Uses in architecture and construction
    c. Emergency services
    d. Engineering
    e. Environmental monitoring
    f. Drones-as-a-service
        i. Media broadcasting
        ii. Wireless internet access
11. Quadcopter flying techniques
    a. Controls and components
    b. Maneuvering
        i. Hovering
        ii. Flying in a circle
        iii. Rotation
12. **Threats**
    a. Personal liability for accidents
    b. Legal consequences for errors / accidents
13. **Skills**
    a. Ability to plan in advance
    b. Ability to envision data coming from a sUAS

Resources

ASA Test Prep Board. *Remote Pilot Test Prep.* 1st. ed.,. Aviation Supplies and Acedemics, 2018.

Federal Aviation Administration. *Airman knowledge Testing Su[pplement (FAA-CT-8080-2G.* 1st. ed.,. Government Printing Office, 2016.

Resources Other
None

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