NC 107: DRONE PILOT LICENSE

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2020
Credits:	0
Total Contact Hours:	24
Lecture Hours :	24
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	48
Transferable to CSU:	No
Transferable to UC:	No
Grading Method:	Non-Credit Course

Catalog Course Description

This course is an introduction to drones/sUAVs (Small unmanned aerial vehicle systems) and prepares students to take the Federal Aviation Administration's Part-107 drone pilot license exam to work as a commercial pilot in the United States. Students will learn flight theory and work hands-on to become familiar with basic drone systems. Students will develop an understanding of local, state and federal regulations, weather reports, proper radio communication terminology, NOTAMs (A notice to airmen), METARs (Aviation Routine Weather Report), airport sectional charts and demonstrate their knowledge/skills in drone piloting. The course will prepare students to succeed in the competitive job market of drone piloting and develop career opportunities in the UAV industry. 24 lecture hours.

Course Objectives

- Prepare students to successfully pass the FAA Part-107 exam for sUAS commercial drone piloting in the United States.
- Interpret possible hazards and development of checklists/ logbooks for flight preparation, drone/battery maintenance, payload capabilities, use of visual observers and field data collection method best practices.
- Demonstrate skills in weather and aviation terminology, proper airport radio communication, UAS/UAV operations and airspace rules and regulations.

Major Course Content

1. Introduction to UAS/UAV drone systems
    a. Origins and brief history of remote sensing operations
    b. Drone system variation and basic UAV/UAS terminology
    c. Modern applications and commercial career opportunities
2. Preparing for the FAA Part-107 exam
    a. Introduction to drone piloting license exam and testing procedures
    b. Proper airport radio communication
    c. Knowledge of weather, NOTAMs, METARs and aviation terminology
    d. Familiarity with airport sectional charts
    e. Knowledge of U.S drone regulation, restrictions and laws
3. Developing knowledge of drone piloting
    a. UAS/UAV system industry best practices
    b. Methods of field data collection and procedures of aerial inspection
    c. Proper drone maintenance techniques
    d. Creation of pre-flight checks and maintenance logs
    e. Proper use of visual observers and parameter safety checks
    f. Proper handling of battery systems
    g. Night operations

Suggested Reading Other Than Required Textbook

Cheng, Eric, Aerial Photography and Videography Using Drones 1st Edition, Peachpit Press, 2015
James Aber Irene Marzolff Johannes Ries Susan Aber, Small-Format Aerial Photography and UAS Imagery 2nd edition, Elsevier, 2019

Examples of Required Writing Assignments

Drones as Weapons Writing Assignment
In this assignment, students consider the use of drones in war and must perform research to support an argument related to drone use as weapons.
Students will complete an essay researching the use of Drone (UAVs) in warfare. Students must write 3-5 pages, 12 font, double spaced with 5 minimum outside sources with work cited page. Students must answer the questions using the textbook and outside sources and follow the guidelines. First, students state their argument and use examples and evidence from the textbook and 2 outside sources to defend their argument.
Researching the use of Drones (UAVs) in warfare
Paragraph 1: How are drones used in warfare? Research three countries using them and describe their effectiveness from at least 2 outside sources
Paragraph 2: Why do many resist the use of drones in warfare? What issues or examples can be given against their use
Paragraph 3: Discuss how drones are changing methods of warfare, use at least 1 outside source to discuss these changes and discuss technological improvements in drones
Paragraph 4: Predict the future of drone use in warfare, argue for their proliferation or dimes and discuss examples to support your argument
Essay will include a rubric that evaluates the essay on 1st- Does the essay meet the requirements of length, citations etc and is clear, concise and addresses the essay prompt accuracy? 2nd- Was each paragraph complete and answered the question required in detail using sources? 3rd- Did the student fully research and explain the answer for each paragraph and did each paragraph include accurate examples and appropriate terminology related to the topic? 4th- Did the student discuss modern examples of drones used in warfare operations and argue for or against their use as weapons?

Examples of Outside Assignments

Hands-on Autonomous Drone Mission Planning Assignment
In this assignment, students will learn how to fly a small hobby grade drone, learn to control it on their own phone using a free program from Ryze, learn how to program the drone to complete autonomous missions using a second free online software program from DroneBlocks and then plan and perform an autonomous mission on their own using the drone

and the classroom. Students will have several class sessions to learn how to fly the drone, class sessions to measure out their mission and more to perform the flights and be evaluated for grade.
Create a program flight using the free software DRONEBLOCKS for the Ryze Tello drone http://amaflightschool.org/diy/droneblocks https://learn.droneblocks.io/p/introduction-to-tello-edu-drone-programming-with-droneblocks https://learn.droneblocks.io/p/droneblocks-curriculum-4th-8th-grade Students will use a free online programming software to plan out and program a flight on the Ryze Tello drone. Each student will create a program and then allow the Tello to perform its mission. Assignment begins with students watching a video to prepare themselves for the project https://youtu.be/ugCQ1f5ICYg
Next, students will have practice with the Ryze Tello drone to learn how to fly and control the drone using their phones https://www.ryzerobotics.com/tello
Students next download DRONEBLOCKS Program and learn how to program a mission for the Ryze Tello drone https://www.droneblocks.io/ Students must follow the required mission produces: 1st- Measure a section of the classroom out and write down the distances from doors, walls and desks to plan out there flight mission. All distances for the mission must be known and must be in units of centimeters and meters including elevation changes 2nd- Using the DRONEBLOCKS website/ Phone application, prepare a flight mission that will have the Tello drone performing at least: 3 Flips, 5-20 right turns, 5-20 left turns, 1 high speed section of at least 10 feet, elevation rise of 3 feet, 2 landings/take-offs and 1 circle around an object. Drone must start in a pre-determined location and complete its pre- programed mission and return to original location to receive full assignment credit Students will use the Ryze Tello Drone in class in an hands-on activity and be evaluated based on the following criteria in the assignment rubric: 1st- Did the students successful plan and control the drone? 2nd- Was the flight plan accurate and performed the required tasks accurately? 3rd- Did the students have control over the drone or was there a crash? 4th- Did the student correctly use the software, plan out the mission with measurements or where there issues with lengths or locations that prevented the drone from completing the mission? 5th- Did drone perform the required flips, elevation changes and distances correctly and without assistance from student during the mission?

Instruction Type(s)

Lecture, Online Education Lecture