

**CS 76.11 Course Outline as of Fall 2022****CATALOG INFORMATION**

Dept and Nbr: CS 76.11 Title: COMMERCIAL DRONE IMAGING

Full Title: Drone Piloting and Imaging

Last Reviewed: 2/28/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.50	17.5	Lecture Scheduled	43.75
Minimum	3.00	Lab Scheduled	1.50	6	Lab Scheduled	26.25
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 87.50

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

In this course, students will be introduced to multiple facets of drone technology. Topics include learning how to fly a drone safely, the rules and regulations related to drone operation, how to capture videos and stills using drones, how drones are used in industry, and how to prepare for the FAA Part 107 commercial drone pilot exam. Successful completion of this course qualifies students to earn the Drone Studies: Commercial Drone Certification Certificate. Provides a starting point to using drones in multiple disciplines and careers.

**Prerequisites/Corequisites:****Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100

**Limits on Enrollment:****Schedule of Classes Information:**

Description: In this course, students will be introduced to multiple facets of drone technology. Topics include learning how to fly a drone safely, the rules and regulations related to drone operation, how to capture videos and stills using drones, how drones are used in industry, and

how to prepare for the FAA Part 107 commercial drone pilot exam. Successful completion of this course qualifies students to earn the Drone Studies: Commercial Drone Certification Certificate. Provides a starting point to using drones in multiple disciplines and careers. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective: Fall 2017	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Safely operate common Unmanned Aerial Systems (UAS) (drones).
2. Capture still and video images from a UAS.
3. Prepare to take the Federal Aviation Administration (FAA) UAS commercial pilot license exam.
4. Understand the varied uses of unmanned vehicles in multiple disciplines and careers.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Define terminology related to UAS (Unmanned Aerial System) technology.
2. Differentiate among different kinds of drones.
3. Compare features of popular drone models.
4. Select the proper equipment required for UAS photography.
5. Discuss the safety and ethical issues related to drone photography.
6. Capture still and video images while flying a UAS.
7. Prepare to take the FAA UAS commercial pilot license exam.
8. Analyze the uses of UAS in multiple discipline and career areas.
9. Understand the fundamental mechanics of flight.

### **Topics and Scope:**

- I. Digital Imaging with Drones\*

- A. Drone imaging equipment
- B. Imaging limitations
- C. Camera direction
  - 1. Lighting
  - 2. Shot composition
- D. Still vs. video
- E. Post processing
- II. UAS Uses
  - A. Real Estate
  - B. Agriculture
  - C. Public Safety
    - 1. Police
    - 2. Fire
    - 3. Search and rescue
  - D. Surveying/Mapping
  - E. Wildlife management
  - F. Forest management
  - G. Video production
  - H. Photography
  - I. Architecture
  - J. Journalism
  - K. Equipment maintenance
- III. Aviation History
- IV. UAS Terminology
- V. Mechanics of Flight
  - A. Aerodynamics
    - 1. Lift
    - 2. Drag
    - 3. Roll
    - 4. Pitch
    - 5. Yaw
  - B. Control
    - 1. Sensor Input
    - 2. Actuator Result
    - 3. Open vs. Closed Loop Systems
  - C. Materials
  - D. Propulsion
    - 1. Fixed Wing
    - 2. Rotary Wing
  - E. Sensors
    - 1. Visual
    - 2. Ultrasound
    - 3. Thermal/Infrared
    - 4. Gyroscope
    - 5. Accelerometer
    - 6. LIDAR
    - 7. GPS
- VI. UAS Equipment and Technology
  - A. Size
    - 1. Micro
    - 2. Mini
    - 3. Small

- 4. Large
- B. Type
  - 1. Glider
  - 2. Wing Body
  - 3. Helicopter
  - 4. Ducted Fan
  - 5. Quadcopter
  - 6. Hexcopter
  - 7. Fixed-wing
- C. Features
  - 1. GPS
  - 2. Cameras
  - 3. Controllers
  - 4. Propulsion
    - a. Electric
    - b. Gas
- D. Performance
  - 1. Speed
  - 2. Battery Life
- E. Parts
  - 1. Body
  - 2. Motors
  - 3. Propellers
  - 4. Batteries
  - 5. Cameras
  - 6. Controllers
  - 7. Storage options
- VII. Safety and Ethics
  - A. Personal safety
  - B. Property safety
  - C. Privacy concerns
- VIII. UAS Laws and Regulations
  - A. FAA regulations
    - 1. Airspace issues
    - 2. Hobby vs. commercial usage
    - 3. Licensing
  - B. Local laws
- IX. Flying\*
  - A. Flight planning
  - B. Hovering and tilting
  - C. Flight patterns
    - 1. Tracking
    - 2. Following
    - 3. Waypoints
  - D. Options vs. limitations
  - E. Flight Logging
  - F. Aircraft Maintenance
- X. FAA Certification
  - A. Remote Pilot
  - B. Weather
  - C. Charts
  - D. Air Traffic Control

## E. Visual Line of Sight (VLOS)

\*The above sections are covered in Lab

### Assignment:

#### Lecture Related Assignments:

1. Ten to twenty pages of reading per week.
2. Digital imaging group drone project, including shot planning, image and video capture, creation of an asset catalog, trailer video, and final video production.
3. Weekly forum posts on class-related topics.
4. Compile a glossary of drone- and aviation-related terminology.
5. Midterm and Final exams.

#### Lab Related Assignments:

1. Drone flight test

### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Forum posts, glossary

Writing  
15 - 40%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Video catalog

Problem solving  
10 - 25%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Drone flight test, photo and video captures, trailer video, promotional video

Skill Demonstrations  
20 - 35%

**Exams:** All forms of formal testing, other than skill performance exams.

Exams to include multiple choice, matching items, completion, short answer

Exams  
10 - 30%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation

Other Category  
0 - 10%

### Representative Textbooks and Materials:

Remote Pilot Test Prep 2022, ASA Test Prep Board, Aviation Supplies & Academics, Inc. 2022

