## 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

Total Out of Class Hours: 87.50

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable
Grading: $\quad$ Grade or P/NP
Repeatability: $\quad 00$ - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

## Catalog Description:

An introduction to using drones for digital imaging. This course is designed to give the student the ability to photograph both stills and videos from drones. Emphasis is placed on safety, equipment selection, flying, and becoming licensed to use drones for commercial purposes. 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: An introduction to using drones for digital imaging. This course is designed to give the student the ability to photograph both stills and videos from drones. Emphasis is placed on safety, equipment selection, flying, and becoming licensed to use drones for commercial purposes. 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:

AS Degree:
CSU GE:
IGETC: Transfer Area
CSU Transfer: Transferable Effective:

UC Transfer:
Area
Transfer Area

Effective:
Fall 2017 Inactive:
Effective: Inactive:
Effective: Inactive:
Effective: Inactive:

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:

Upon completion of the course, students will 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
3. Police
4. Fire
5. 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
6. Lift
7. Drag
8. Roll
9. Pitch
10. Yaw
B. Control
11. Sensor Input
12. Actuator Result
13. Open vs. Closed Loop Systems
C. Materials
D. Propulsion
14. Fixed Wing
15. Rotary Wing
E. Sensors
16. Visual
17. Ultrasound
18. Thermal/Infrared
19. Gyroscope
20. Accelerometer
21. LIDAR
22. GPS
VI. UAS Equipment and Technology
A. Size
23. Micro
24. Mini
25. Small
26. Large
B. Type
27. Glider
28. Wing Body
29. Helicopter
30. Ducted Fan
31. Quadcopter
32. Hexcopter
33. Fixed-wing
C. Features
34. GPS
35. Cameras
36. Controllers
37. Propulsion
a. Electric
b. Gas
D. Performance
38. Speed
39. Battery Life
E. Parts
40. Body
41. Motors
42. Propellers
43. Batteries
44. Cameras
45. Controllers
46. Storage options
VII. Safety and Ethics
A. Personal safety
B. Property safety
C. Privacy concerns
VIII. UAS Laws and Regulations
A. FAA regulations
47. Airspace issues
48. Hobby vs. commercial usage
49. Licensing
B. Local laws
IX. Flying*
A. Flight planning
B. Hovering and tilting
C. Flight patterns
50. Tracking
51. Following
52. 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 drone project proposal: contains rough ideas, sketches, shots that team members will create, required equipment, along with a description of the message to convey to target audience
3. Weekly forum posts on class-related topics
4. FAA exam preparation worksheets
5. Midterm and Final exams
6. Written paper discussing job possibilities in this developing industry

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.

Written proposal, forum posts, job possibility paper
Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or noncomputational problem solving skills.

Exam preparation worksheets
Problem solving 10-25\%

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

Drone flight test
Exams: All forms of formal testing, other than skill performance exams.

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

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

Attendance and participation

| Exams |
| :---: |
| $10-30 \%$ |

## Representative Textbooks and Materials:

Aerial Photography and Videography Using Drones. Cheng, Eric. Peachpit Press. 2015
Getting Started with Hobby Quadcopters and Drones: Learn about, buy and fly these amazing aerial vehicles. Issod, Craig. CreateSpace Independent Publishing Platform. 2013

