

**Course Outline**

COURSE: AMT 227                      DIVISION: 50                      ALSO LISTED AS:

TERM EFFECTIVE: Spring 2019                      CURRICULUM APPROVAL DATE: 05/14/2018

SHORT TITLE: DRONE AERIAL PHOTO AND VIDEO

LONG TITLE: Drone Aerial Photography and Videography

| Units | Number of Weeks |          | Contact Hours/Week |          | Total Contact Hours |
|-------|-----------------|----------|--------------------|----------|---------------------|
| 3     | 18              | Lecture: | 2                  | Lecture: | 36                  |
|       |                 | Lab:     | 3                  | Lab:     | 54                  |
|       |                 | Other:   | 0                  | Other:   | 0                   |
|       |                 | Total:   | 5                  | Total:   | 90                  |

**COURSE DESCRIPTION:**

This course is designed to provide the student with the skills which will allow them to capture and analyze photos and videos from drones. Emphasis is placed on cameras and image software available, applications, and techniques for analyzing imagery. PREREQUISITE: AMT 225

**PREREQUISITES:**

Completion of AMT 225, as UG, with a grade of C or better.

**COREQUISITES:**

CREDIT STATUS: D - Credit - Degree Applicable

**GRADING MODES**

- L - Standard Letter Grade
- P - Pass/No Pass

REPEATABILITY: N - Course may not be repeated

**SCHEDULE TYPES:**

- 02 - Lecture and/or discussion
- 03 - Lecture/Laboratory
- 04 - Laboratory/Studio/Activity
- 04A - Laboratory - LEH 0.65
- 05 - Hybrid
- 72 - Dist. Ed Internet Delayed

**STUDENT LEARNING OUTCOMES:**

1. Describe how images can be acquired through the use of drones.

Measure of assessment: Homework, Paper

Year assessed, or planned year of assessment: 2018

Semester: Fall

2. Process imagery acquired from a drone and conduct an analysis of those images.

Measure of assessment: Report, Homework

Year assessed, or planned year of assessment: 2018

**CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS**

Curriculum Approval Date: 05/14/2018

3 Hours:

1) Introduction to Remote Sensing - Satellites, Airborne Platforms, Sensor Systems

Student Performance Objectives: Describe the different types of sensors and explain their functions.

6 Hours:

2) Types of Camera Systems - Still Pictures, Videography, First Person View

Student Performance Objectives: Describe the different types of imaging systems. Discuss how they can be used to gather information. State the benefits of each system. Discuss the principles of shooting aerial imagery to include videography and photography.

4 Hours:

3) Introduction to the Use of Gimbals and Global Positioning Systems (GPS)

Student Performance Objectives: Describe the use of a gimbal. Explain how to mount one on a drone. Discuss the benefits of using GPS controls.

6 Hours:

4) Types of Applications for the Use of Drone Imagery - Agriculture; Law Enforcement; Fire; Search and Rescue; Emergency Response; Military; Inspections of Bridges, Towers, Buildings and Power Lines; Natural and Cultural Resources Management; Business

Student Performance Objectives: Identify the different applications that drone imagery can be used for. Explain the benefits to using drone imagery.

6 Hours:

5) Types of Image Processing and Editing Software

Student Performance Objectives: Identify the different types of software that can be used for image processing and for image editing. State the advantages of each type of software.

9 Hours:

6) Techniques for Processing and Analyzing Imagery

Student Performance Objectives: Describe the techniques for processing and for analyzing imagery from drones. Select one of the techniques and process the imagery acquired from the drone.

2 Hours: FINAL

Lab Content:

4.5 Hours:

1) Remote Sensing - Investigating how they work and utilizing sensing equipment.

Student Performance Objectives: Demonstrate how various remote sensing equipment works. Utilize this equipment in at least two different functions.

9 Hours:

2) Camera Systems - Investigating how they work. Utilizing them in practical applications.

Student Performance Objectives: Demonstrate the use of camera systems. Capture video and images using drone technology. Demonstrate the principles of shooting aerial imagery to include videography and photography.

6 Hours:

3) Gimbals, GPS, and Other Stabilizing Equipment

Student Performance Objectives: Demonstrate how to mount a gimbal on a drone. Demonstrate the use of control systems for both the drone and camera systems. Solve the following situation: The gimbal failed to control the camera system. Troubleshoot the problem, repair the gimbal, and test it to determine that it is functioning.

9 Hours:

4) Applications for the Use of Drone Imagery

Student Performance Objectives: Fly missions and acquire video and photographic images that could be used in at least three different applications.

9 Hours:

5) Image Processing and Editing Software - Investigating how they work. Utilizing them in practical applications.

Student Performance Objectives: Utilize a variety of software to process and edit imagery.

13.5 Hours:

6) Processing and Analyzing Imagery - Investigating how they work. Utilizing them in practical applications.

Student Performance Objectives: Demonstrate the proper techniques for processing and analyzing imagery acquired through the use of a drone.

**METHODS OF INSTRUCTION:**

lecture, discussion, audio-visual, guided practice, demonstration

**OUT OF CLASS ASSIGNMENTS:**

Required Outside Hours: 6

Assignment Description: Read related textbook chapter and/or assigned material. Homework: Select an industry and provide examples of how they can benefit from sensors that can be packed into a drone.

Required Outside Hours: 12

Assignment Description: Read related textbook chapter and/or assigned material. Research the cameras available for drones, state their uses, support available for each one, and determine which one(s) your drone would support. Come prepare to discuss your findings with the class.

Required Outside Hours: 8

Assignment Description: Read related textbook chapter and/or assigned material. Research the right gimbal for your drone and state its features. Come prepare to discuss your findings with the class.

Required Outside Hours: 14

Assignment Description: Read related textbook chapter and/or assigned material. Report: Choose an application for the use of drone technology and write a 2 - 3 page paper on how it is used to solve problems.

Required Outside Hours: 12

Assignment Description: Read related textbook chapter and/or assigned material. Homework: Investigate the various software available for image processing and for image editing and come prepared to discuss with the class. Investigate the options available for sharing pictures and video online. Select one of the free options and visit them online. Write a 1 page paper on their services.

Required Outside Hours: 20

Assignment Description: Read related textbook chapter and/or assigned material. Report: Read about the applications for drone obtained imagery for Wild-land Fire or Arid Range lands or Wetlands. Write about the techniques and their uses. Homework: Acquire imagery of a local reservoir using a drone and measure the volume of the reservoir.

**METHODS OF EVALUATION:**

Writing assignments

Percent of total grade: 20.00 %

Homework

Problem-solving assignments

Percent of total grade: 20.00 %

Report, Paper, Demonstration

Skill demonstrations

Percent of total grade: 40.00 %

Performance Exams

Objective examinations

Percent of total grade: 20.00 %

Quizzes, Exams

### **REPRESENTATIVE TEXTBOOKS:**

Required Representative Textbooks

Mark LaFay. Drones for Dummies. Hoboken, NJ: Wiley Publishing,2015.

ISBN: 978-1-119-04978-4

Reading Level of Text, Grade: 10th Verified by: MS Word

Required Other Texts and Materials

Software such as: Portable Hard Drive and Mini Scan Disks and a micro SD card that will go in the drone.

Recommended Other Texts and Materials

Aerial Photography and Videography Using Drones by Eric Chung; 15th Edition; 2015; Publisher: Vitalsource Technologies, Inc.

### **ARTICULATION and CERTIFICATE INFORMATION**

Associate Degree:

CSU GE:

IGETC:

CSU TRANSFER:

Not Transferable

UC TRANSFER:

Not Transferable

### **SUPPLEMENTAL DATA:**

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN:

CAN Sequence:

CSU Crosswalk Course Department:

CSU Crosswalk Course Number:

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: C

Maximum Hours: 5

Minimum Hours: 5

Course Control Number: CCC000582326

Sports/Physical Education Course: N

Taxonomy of Program: 095000