NC 108: DRONE MAPPING

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2022
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

Introduction to drone mapping and geo-spatial data collection/analysis tools to prepare students for employment in the UAS/UAV industry. Instruction includes hands-on experience in drone mission planning, performance of aerial data collection and production of site reports, orthomosaic images and 3D models. Other topics include requesting FAA airspace authorization, utilization of ground control points, crews and visual observers, night operation procedures and operational safety and emergency procedures. 24 lecture hours.

Course Objectives

- Develop skills and knowldge necessary for gaining employment in the UAV/UAS industry
- Demonstrate skills in drone mapping software, data collection methods and Geo-Spatial tools
- Performance of hands-on skills in autonomous drone flight, placement and implementation of GPS ground control points and pre-flight LAANC authorization requests

Major Course Content

1. Introduction to commercial geo-spatial tools and methods
   a. Intro to use of aerial mapping and modeling software
   b. Intro to the use of FAA airspace and LAANC authorization platforms
   c. Intro to commercial/public safety drone applications
   d. Current industry employment opportunities and salary expectations
2. Preparation for real-world commercial autonomous drone flights
   a. Utilizing crews and visual observers on site
   b. Night operations procedures
   c. Operational Safety and Emergency procedures
   d. Use and placement of Ground Control Points and GPS data for increased model/map accuracy
   e. Pre and Post flight procedures and best practices
3. Develop knowledge and skills in geo-spatial mapping software
   a. Hands-on use of drones to create autonomous pre-planned flight
   b. Hands-on use of drones to create a 3D model of building/field site
   c. Data processing and development of site reports and 3D models
   d. Post-processing reports and presentation of data

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

Drone Industry Research Assignment Students will be required to choose an avenue/field of the drone industry to research and write a 3-5 page, double space, 12 font, MLA or APA formatted report that includes a 1 page bibliography with at least 10 sources one of which must be a phone/email interview with professional in the field of study currently working with drones. Examples of career avenues may be as a drone pilot for real estate, industrial inspections, military/police surveillance or other uses of drones in commercial applications. Students will begin by performing a mock "job search" in the region for careers in the chosen field. Write a report on what jobs are currently available based on job searches for at least five employment sites. Research the average salary of those in the chosen field and discuss what the potential salary may be after further education in the field. Include in the report must be: - A brief history of the field or use of drones chosen - List of current companies or organizations that are hiring in the field - Description or map showing where the most openings in the field are located geographically both nationally and internationally - Discussion of typical duties and responsibilities for a chosen career in the field - Phone/ E-mail interview with person in the field: Example questions may include what is a typical day in your job? what education or training helped you get your job or helps you perform your duties? How did you first get interested in drones/UAVs? Reports will be graded based on students meeting the required format for length, use of sources, use of detail and clear descriptions of the career path, job search results, interview questions/answers and description of typical job duties

Examples of Outside Assignments

3D modeling of Citrus College building site project This assignment requires students to work as a group to choose a building on campus to model, plan and prepare for an autonomous flight and develop a flight plan in DroneDeploy to collect the 3D model data. Students will be required to observe weather data and conditions for the planned collection day and judge appropriate conditions for flight Students will participate in autonomous data collection using a drone and monitor the flight as visual observers always maintaining line-of-sight on the drone and communicating with each other over two-way radios Students will participate during the data processing and help to quality control images taken, check for issues, create reports in DroneDeploy as well as produce a 3D model of the building to be presented in print and jpg format. Students will be required to write a detailed report discussing the process of planning, flight data collection and the creation of the model. Students must write a minimum of 3-5 pages double spaced at 12font and include weather information, justification for choosing the site, discussion of how the model was created and detail as to what occurred the day of the flight and any issues that occurred before, during or after the flight. Students must include in their reports a discussion of

"best practices" and what would be done differently if the project could be repeated.

Instruction Type(s)

Lecture, Online Education Lecture