NC 110: DRONE APPLICATIONS IN PUBLIC SAFETY

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2024
Credits:	0
Total Contact Hours:	24
Lecture Hours :	24
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	48
Total Student Learning Hours:	72
Transferable to CSU:	No
Transferable to UC:	No
Grading Method:	Non-Credit Course

Catalog Course Description

Introduction to drone applications in public safety and advanced hands-on drone flight training. Students will acquire knowledge in thermal camera systems, autonomous drone systems and skills in FPV flight and aerial photography for use in search and rescue operations, firefighting, law enforcement and emergency operations. Instruction on current UAS regulations, safety and flight crew protocol will also be covered. 24 lecture hours.

Course Objectives

- Gain knowldge of public safety flight procedures, crew management, thermal image collection and fundamental flight skills necessary for gaining employment in the public safety and UAV/UAS industries.
- Demonstrate proficiency in public safety drone flight, thermal image collection, FPV flight, use of various drone systems and accessories specific to public safety sector, current drone mapping software, flight operations and crew resource management.
- Acquire knowledge of current industry best-practices, applications, salaries, customer service considerations, working conditions and methods specific to fire fighting, law enforcement, emergency operations, search and rescue jobs that utilize drones.

Major Course Content

1. Introduction to public safety drone applications and techniques
   a. Law enforcement: crime scene record, night operations and surveillance
   b. Close quarters and indoor use of drones
   c. Fire fighting operations and thermal image collection
   d. Operating drones for emergency and disaster relief efforts
   e. Search-and-Rescue operations with FPV drones and visual observers through obstacle course simulation
   f. Thermal image collection and processing
   g. Orthomoasic photography and 3-D modeling
   h. Use of autonomous drone for public safety

2. Participation in advanced hands-on flight training exercises
   a. Use of thermal cameras for the collection and processing of thermal images
   b. Basic drone flight movements including hover, hover+yaw, flying square pattern with no yaw, square pattern with yaw, target practice with marked spots, flying in a circle no yaw, changing directions no yaw, changing directions with yaw, out-back-land, landing, avoiding obstacles and using inverted controls (orientated backwards flying).
   c. Advanced aerial photography training exercises including: panning, tilting, zooming, flying backward and up 'dronie', flying close to objects, tri-pod mode, 4-axis camera motion, flying at max altitude, top-down view/tilt-axis practice, orbit a POI, using RTH feature and flying without GPS.
   d. Completion of drone obstacle courses and accident avoidance
   e. Utilizing visual observers and night operations procedures
   f. Operational safety and emergency procedures
   g. Crew resource managment
   h. Current UAS regulations

Suggested Reading Other Than Required Textbook

James Aber Irene Marzolff Johannes Ries Susan Aber, Small-Format Aerial Photography and UAS Imagery 2nd edition, Elsevier, 2019
U.S Department of Transportation and Federal Aviation Administration Part-107 Exam Manual
U.S Department of Transportation and Federal Aviation Administration Part-107 Exam Manual https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/media/remote_pilot_study_guide.pdf
FAA Remote Pilot Knowledge Test Guide https://www.faa.gov/training_testing/testing/test_guides/media/remote_pilot_ktg.pdf
Making Great Maps:The Complete Guide to Professional Mapping with DroneDeploy by Adam Carp https://connexicore.com/wp-content/uploads/2020/05/Drone_Deploy-_Making_Great_Maps_ebook.pdf

Examples of Required Writing Assignments

Public Safety Drone Application Research Assignment Students will be required to choose a public safety 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 professionals in the field of study currently working with drones. Students will begin by choosing 3 organizations in their chosen field and write a brief summary of what the companies use the drone to do and their operations in the organization. Next, perform an interview with someone working at one of the chosen organizations to determine what the function of drones serve the organization and what education in drones was necessary for hire. Next, students will write a report on what jobs are currently available based on job searches for at least five employment sites and research the average salary of those in the chosen field and discuss what the potential salary may be after further education in the field. Included in the report: - A brief history of the public safety 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

Search and Rescue Project This assignment requires students to work as a group to complete a search and rescue scenario on campus. Students will be required to observe weather data and conditions for the planned collection days and judge appropriate conditions for flights Students will participate by 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 scenario to complete activities and accomplish goals to achieve the objectives of the operation. Students will be required to write a detailed report discussing the process of setting up and completing the search and rescue operation. Students must write a minimum of 3-5 pages double spaced at 12font and include weather information, procedures, crew resource management, activities completed and the outcome of the operation. 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