UAS 200: UNCREWED AIRCRAFT SYSTEMS ADVANCED DRONE LAB

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2025
Credits:	.5
Total Contact Hours:	27
Lab Hours:	27
Hours Arranged:	0
Outside of Class Hours:	0
Total Student Learning Hours:	27
Transferable to CSU:	No
Transferable to UC:	No
Grading Method:	Standard Letter

Catalog Course Description

Advanced skills in operating uncrewed aircraft systems. Topics include analyzing flight characteristics, utilizing flight planning software, sensor selection and software use, spectrum analysis, safety practices and risk analysis, incident reporting, and data analysis. Field trips are required. 27 lab hours.

Course Objectives

- Demonstrate proficiency in commercial drone flight, aerial photography, cinematography, multimedia production,drone mapping, flight operations and data collection methods.
- Performance of hands-on skills in autonomous drone flight, placement and implementation of GPS ground control points and pre-flight LAANC authorization requests
- Demonstrate proficiency in drone flying, drone data collection, FPV flight, obstacle course completion, thermal image collection, flight crew management, mission planning, operational safety, quality control procedures and utilization of industry standard mapping and media editing software.

Lab Content

Week 1: Introduction to Drone Technology

- Overview of different types of drones and their components
- Introduction to flight controllers, motors, propellers, and other hardware
- Safety precautions and pre-flight checks

Week 2: Basic Flight Maneuvers

- Understanding drone controls: throttle, pitch, roll, and yaw
- Hands-on practice with basic flight maneuvers such as takeoff, landing, hovering, and altitude control
- Introduction to flight modes: manual, altitude hold, and GPS-assisted flight

Week 3: Advanced Flight Techniques

- Introduction to advanced flight maneuvers: banked turns, figure eights, and coordinated movements
- Practice with flying in different weather conditions and wind speeds
- Emergency procedures and recovery techniques

Week 4: Flight Planning and Mission Execution

- Introduction to flight planning software and applications
- Understanding airspace restrictions and regulations
- Planning and executing simple flight missions with specific objectives

Week 5: Autonomous Flight and Waypoint Navigation

- Introduction to autonomous flight modes and waypoint navigation
- Hands-on practice with setting up and executing autonomous flight missions
- Understanding the limitations and considerations of autonomous flight

Week 6: Aerial Photography and Videography

- Introduction to drone cameras and gimbals
- Techniques for capturing high-quality aerial photos and videos
- Hands-on practice with framing shots, adjusting camera settings, and recording footage

Week 7: Flight Simulation and Virtual Reality

- Introduction to drone flight simulation software and virtual reality (VR) systems
- Practice with simulating various flight scenarios and environments
- Integration of flight simulation with real-world flight training

Week 8: Safety and Maintenance

- Understanding routine maintenance tasks and pre-flight checks
- Safety protocols for battery handling, motor maintenance, and propeller replacement
- Troubleshooting common issues and performing minor repairs

Week 9: Specialty Flight Training

- Introduction to specialized drone applications such as search and rescue, mapping, and inspection
- Hands-on practice with flight techniques and mission planning for specific applications
- Guest speakers from industry sharing insights and best practices

Week 10: Final Flight Assessment and Project Showcase

- Individual flight assessments to demonstrate proficiency in flight maneuvers and mission execution
- Presentation of final projects showcasing skills learned throughout the course
- Reflection on personal growth and learning outcomes

Note: This course will include both indoor and outdoor flight training sessions, weather permitting. Safety will be paramount throughout the course, and students will be required to adhere to all safety guidelines and regulations.

Suggested Reading Other Than Required Textbook

Remote Pilot # Small Unmanned Aircraft Systems Airman Certification Standards https://www.faa.gov/training_testing/testing/acs/media/uas_acs.pdf
Remote Pilot – Small Unmanned Aircraft Systems Study Guide https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/media/remote_pilot_study_guide.pdf
Pilot's Handbook of Aeronautical Knowledge https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/
Summary of small unmanned aircraft rule (PART 107) https://www.faa.gov/uas/resources/policy_library/media/Part_107_Summary.pdf
Mapping Society and Technology Manson, S. M. (ed.) (2017). Mapping, Society, and Technology. Minneapolis, Minnesota: University of Minnesota Libraries Publishing. URL: http://z.umn.edu/mst
Policy Document Library https://www.faa.gov/uas/resources/policy_library/#107
Unmanned Aircraft Systems in the Cyber Domain Nichols, Randall K.; Mumm, Hans C.; Lonstein, Wayne D.; Ryan, Julie J.C.H.; Carter, Candice; and Hood, John-Paul, "Unmanned Aircraft Systems in the Cyber Domain" (2019). NPP eBooks. 27. https://newprairiepress.org/ebooks/27
Free Study Guide https://northrup.photo/free-faa-part-107-suas-drone-certification-study-guide/

Examples of Required Writing Assignments

Research Paper on the Impact of Drone Technology in a Specific Industry
Assignment Overview: In this writing assignment, students will conduct in-depth research on the impact of drone technology within a specific industry of their choice. Through comprehensive analysis and critical evaluation, students will explore the ways in which drones are revolutionizing operations, improving efficiency, and creating new opportunities within their chosen industry. The research paper will require students to synthesize information from academic sources, industry reports, and case studies to present a well-rounded understanding of the subject matter.
Assignment Objectives:
Demonstrate a deep understanding of drone technology and its applications within a specific industry. Conduct thorough research using academic sources, industry reports, and case studies. Analyze the impact of drone technology on various aspects of the chosen industry, including operations, safety, productivity, and regulatory compliance. Evaluate the opportunities and challenges associated with the adoption of drone technology within the industry. Develop well-supported arguments and conclusions based on evidence and analysis.
Assignment Guidelines:
Topic Selection: Choose a specific industry in which drone technology is making significant advancements. Examples include agriculture, construction, filmmaking, environmental monitoring, logistics, or public safety. Ensure that the chosen industry has sufficient literature and resources available for research.
Research: Conduct comprehensive research using academic journals, industry reports, government publications, and reputable websites. Gather information on the current state of drone technology within the chosen industry, including key players, emerging trends, and recent developments. Explore case studies or real-world examples that illustrate the practical applications and impact of drone technology in the industry.
Structure:
Introduction: Provide an overview of the chosen industry and its relevance to drone technology. Clearly state the research question or thesis statement that will guide the paper.
Literature Review: Summarize existing literature on drone technology and its applications within the chosen industry. Identify key concepts, trends, and debates in the literature.
Analysis: Discuss the impact of drone technology on various aspects of the industry, such as operations, efficiency, safety, and regulatory compliance. Evaluate the benefits and challenges associated with the adoption of drone technology. Provide examples or case studies to support your analysis.
Conclusion: Summarize the key findings of the research. Discuss implications for the future of the industry and potential areas for further research.
Citation and Referencing: Use proper citation and referencing format (e.g., APA, MLA) for all sources cited in the paper. Ensure accuracy and consistency in citing sources throughout the paper.
Length and Formatting: The research paper should be between 2000-2500 words, excluding references. Use a clear and organized structure with appropriate headings and subheadings. Format the paper according to the guidelines provided by the instructor or department.
Submission: Submit the research paper by the specified deadline. Follow any additional instructions provided by the instructor regarding formatting, submission format, or assessment criteria.
By completing this assignment, students will gain a deeper understanding of the transformative impact of drone technology within a specific industry and develop critical research and writing skills applicable to various academic and professional contexts.

Examples of Outside Assignments

Video Sample Reel Project In this assignment you will work as a group to plan, film and edit a sample reel for an assigned industry - Observe weather data and conditions for the planned collection days and judge appropriate conditions for flights -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 -Participate during the editing processing and help to quality control images taken, check for issues, create video files and producing a final video sample -Write a detailed report discussing the process of planning, flight data collection and the creation of the video. Report must be a minimum of 3-5 pages double spaced at 12font and include weather information, justification for choosing the site, shots and video, discussion of how the video as created and detail as to what occurred the day of the flight and any issues that occurred before, during or after the flight. -Include in your report a discussion of "best practices" and what would be done differently if the project could be repeated.

Instruction Type(s)

Lab