

Lecture Contact Hours: 24-27; Outside-of-class Hours: 48-54;
Laboratory Contact Hours: 72-81; Outside-of-class Hours: 0;
Total Student Learning Hours: 144-162

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Surveying 100 – Unmanned Aerial System (Drone) Technologies: Safety, Assembly, and Basic Flight

1.5 hours lecture, 1.5 units
4.5 hours laboratory, 1.5 units
Total units: 3

Catalog Description

An introduction to using drones in the field of surveying. Students will learn about FAA regulations to fly commercial drones, safety considerations for operating at a site, how to transport, assemble, and disassemble a drone, and obtain stick time operating and supporting the operation of a drone.

Prerequisite

None

Recommended Preparation

The ability to communicate via reading and writing. Basic ability to use computers.

Course Content

- 1) General overview of types of drones used in surveying
- 2) Common industry terminology
- 3) FAA regulations required to fly drones commercially
 - a. Requirements to be a FAA Certified Remote Pilot
- 4) Safety protocols to work at manned/unmanned sites
- 5) Identifying project datums
- 6) Components of a drone
 - a. How to assemble, disassemble, and transport a drone
- 7) Preparing a drone for flight
- 8) 20 hours of stick time per student

Course Objectives

Students will be able to:

- 1) Demonstrate safety and regulatory practices for flying a drone at a surveying site
- 2) Demonstrate the ability to assemble, disassemble, and transport a drone
- 3) Demonstrate the ability to fly a drone
- 4) Describe the requirements for FAA Certified Remote Pilot licensure

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in the subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Classroom assessment tools, possibly including reading quizzes, concept quizzes, attention quizzes, and lecture activities working through example problems with students. An example would be a multiple-choice question answered using an audience response system in which students demonstrate their understanding of FAA regulations for Certified Remote Pilot licensure.

- 2) Homework requiring students to interact with the course material and to evaluate their ability to extend the classroom and reading experience to novel situations. An example would be having students describing the steps to properly ensure a drone is prepared for flight.
- 3) Periodic quizzes, midterm/final examinations, and/or projects to evaluate student learning and retention of the material on the time scale of weeks. Questions are mostly word problems but with some short answer conceptual questions. An example would be an exam problem in which students are asked to describe safety practices used on a manned site.
- 4) Hours of stick (flight) time. Industry recommends students obtain real experience operating the drones, and therefore hours of flight time can be connected to the course grade.

Special Materials Required of Student

None

Minimum Instructional Facilities

- 1) Access to representative drones used in the surveying field, such as DJI Mavic 3E (2 students to one drone)
- 2) Access to land/space on campus to fly drones
- 3) Smart classroom with overhead projector/screen

Method of Instruction

- 1) Group Projects/Activities
- 2) Guest Speakers
- 3) Lab
- 4) Lecture
- 5) Observation
- 6) Videos/Film
- 7) Demonstration
- 8) Discussion

Out-of-Class Assignments

Weekly homework including reading and writing assignments

Texts and References

- 1) Required (representative example): *Time to Fly: Step by Step Guide (Survey Mapping Made Simple)*, Jim Crume, 2018, ISBN-13: 978-1722169053.
- 2) Supplemental: *Remote Pilot Exam Prep: Master the FAA Part 107 Test and Quickly Launch Your Drone Career – The Full Study Guide with Cutting-Edge Practice Tests and an Exclusive Online Quiz Simulator*, Micheal J. Anderson, 2024, ISBN-13: 979-8338092965

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Demonstrate safety and regulatory practices for flying a drone
- 2) Demonstrate the ability to assemble, disassemble, and transport a drone
- 3) Demonstrate the ability to fly a drone
- 4) Describe the FAA regulations required to fly a drone for surveying work/projects

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Demonstrate safety and regulatory practices for flying a drone
- 2) Demonstrate the ability to assemble, disassemble, and transport a drone
- 3) Demonstrate the ability to fly a drone