

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 101 – Unmanned Aerial System (Drone) Technologies: Data Acquisition and Advanced 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 to collect data in the field of surveying. Students will learn about different drone payloads used in the surveying field, create flight plans to collect surveying data, manage the collection of surveying data, and quality assurance of data.

Prerequisite

“C” grade or higher or “Pass” in SURV 100 or equivalent

Recommended Preparation

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

Entrance Skills

Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:

- 1) Knowledge of the safety and regulatory practices to fly a drone
- 2) Ability to assemble, disassemble, and transport a drone
- 3) Ability to fly a drone

Course Content

- 1) General overview of types of drone payloads used in surveying
- 2) Creation of flight plans to collect surveying data
 - a. Proper reporting of flight plans to the FAA
- 3) Using drones to collect surveying data
- 4) Quality assurance practices to ensure the quality of collected data
 - a. Using ground control points to ensure accuracy of collected data

Course Objectives

Students will be able to:

- 1) Create flight plans to collect specified surveying data
- 2) Operate a drone to collect specified surveying data
- 3) Perform quality assurance practices on collected surveying data

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 logging a flight plan with the FAA.

- 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 what drone payload is best used to achieve a specific task.
- 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 the best practices for setting up ground control points.

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
- 4) Computer lab
- 5) Trimble Business Center or other equivalent software

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) Create flight plans to collect specified surveying data
- 2) Operate a drone to collect specified surveying data
- 3) Perform quality assurance practices on collected surveying data

Student Learning Outcomes

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

- 1) Create flight plans to collect specified surveying data
- 2) Operate a drone to collect specified surveying data
- 3) Perform quality assurance practices on collected surveying data