APT A160: INTRODUCTION TO UAS AUTOMATION

Item	Value
Top Code	302020 - Piloting
Units	4 Total Units
Hours	90 Total Hours (Lecture Hours 63; Lab Hours 27)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

This course introduces students to the automation of Unmanned Aircraft Systems (UAS), including UAS flight control, camera and video capturing, telemetry data analysis and mission management. Throughout the semester, students will work in teams to plan, design and automate Unmanned Aircraft System missions by learning and using Software Development Kits (SDKs) of industry leading UAS providers. UAS projects will include behaviors such as path-following, random roaming with obstacle avoidance and telemetry data collection and analysis. ADVISORY: CIS A090, CIS A100, CIS A111, CS A122, or APT A131. Enrollment Limitation: CIS A160; students who complete APT A160 may not enroll in or receive credit for CIS A160. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Use UAS automation to solve problems that incorporate the use of mission planning, way points, rally points and on-board navigation systems.
2. Collect in-flight UAS telemetry data and employ the use of software to process, analyze and construct meaningful information for the flight mission.

Course Objectives

- 1. Describe the major categories and roles of Unmanned Aircraft Systems (UAS).
- 2. Identify the primary types of sensors used for UAS data collection.
- 3. Use an autopilot software development kit supporting multi-copters, traditional helicopters, fixed wing aircraft and rovers.
- 4. Demonstrate proficiency in using the fundamental automation features of UAS, including waypoints, rally points, events and mission commands.
- 5. Calibrate on-board navigation systems, such as compass, accelerometer and radio control prior to flight mission.
- 6. Safely execute flight mission with intersection of planned rally points and a Return to Launch (RTL) landing.
- 7. Collect flight telemetry data, including geotagged images, video and on-board sensor data.
- 8. Conduct telemetry data analysis using software to provide information about flight mission.

Method(s) of Instruction

- Lecture (02)
- Lab (04)