

DRONE (DRON)

DRON 080 F Federal Aviation Administration Drone Pilot Test Preparation

1 Unit

18 hours lecture per term. This course reviews and prepares students for the Federal Aviation Administration's initial aeronautical knowledge test for a remote pilot certificate, through videos, assignments, quizzes and discussion. It will help guide students on the knowledge to prepare for the FAA certification.

DRON 095 F FPV Drone Piloting

1 Unit

9 hours lecture and 27 hours lab per term. This course will introduce first person view (FPV) drone piloting skills with hands-on flying and lecture. The course will also introduce students to basic maintenance and repair of small quad copter drones used in FPV. Piloting skills for cinematic, freestyle, and racing of FPV aerial quads will be taught and developed throughout this course. (Degree Credit)

DRON 096 F Advanced FPV Piloting and Racing

1 Unit

Prerequisite(s): DRON 095 F with a grade of C or better

9 hours lecture and 27 hours lab per term. This course expands student experience with first person view (FPV) drone piloting skills with hands-on flying and lecture. The course also introduces students to FPV drone racing and piloting skills for cinematic and freestyle flying. (Degree Credit)

DRON 100 F Drone Industry Introduction

1 Unit

18 hours lecture per term. This course is designed to prepare individuals to enter and succeed in a drone-related registered apprenticeship program (RAP) and/or employment by showing them the drone industry and the skills needed for success. (Degree Credit) (CSU)

DRON 101 F Basic Drone Piloting

2 Units

Formerly: TECH 150 F Basic Drone Piloting 36 hours lecture and 9 hours lab per term. This course will train students on the principles, guidelines and regulations regarding effective piloting of unmanned aerial vehicles. Safety and ethics associated with drone flight as well as the law will also be stressed. (Degree Credit) (CSU)

DRON 105 F Applied Drone Piloting

3 Units

Formerly: TECH 151 F Applied Drone Piloting 36 hours lecture and 54 hours lab per term. This course covers the basics of piloting an unmanned aerial system, or drone, and how it can be applied in their preferred career (Administration of Justice, Construction, Cinematography, Environmental Science, Geography, Journalism, Photography, Physical Education, Real Estate, Welding, and many others). Students will photo editing, video creation and be introduced to photo grammetry application. Students will gain industry-specific experience with UAS. (Degree Credit) (CSU)

DRON 115 F Aerial Imaging and Storytelling

3 Units

Formerly: JOUR 215 F UAV/Drone Reporting 36 hours lecture and 54 hours lab per term. This course is designed to give students the ability to learn about UAV's (drones) and how to use them in reporting. Special emphasis is placed on equipment selection, aerial photography and video storytelling, editing and safety and ethical considerations. (Degree Credit) (CSU)

DRON 120 F Infrared Thermal Imaging Level 1

2 Units

Advisory: DRON 101 F

Formerly: TECH 160 F Infrared Thermography 36 hours lecture per term. This course focuses on the use of thermography for a variety of conditions including monitoring/predictive maintenance and identification. Students will learn how to collect, interpret and analyze infrared data in accordance with American Society of Nondestructive Testing standards. (Degree Credit) (CSU)

DRON 125 F Solar Panel Thermal Inspection

2 Units

36 hours lecture and 18 hours lab per term. This course provides students with the knowledge and practical skills needed to perform solar panel inspections using drones equipped with thermal cameras. Students will learn the basics of drone piloting, review common issues with solar panels, and develop skills to identify these issues using thermal imaging technology. The course includes both lecture and hands-on training components, focusing on flight planning, image analysis, and reporting. Prior experience with thermal imaging is required. (Degree Credit) (CSU)

DRON 130 F Aerial Mapping and Photogrammetry

3 Units

45 hours lecture and 27 hours lab per term. This course introduces students to the skills involved in data acquisition and data processing techniques for mapping and photogrammetry by drone. Students will learn principles of uncrewed aerial systems (UAS) and how to use them to acquire data, create mapping images, point clouds, overlays, and 3D meshes. (Degree Credit) (CSU)

DRON 140 F Basic Drone Maintenance and Repair

3 Units

Formerly: Basic Drone Maintenance and Repair 36 hours lecture and 54 hours lab per term. This course provides the student with introductory knowledge of maintenance and repair of small uncrewed aerial vehicles (sUAVs) and prepares them for further studies and/or employment. The course involves, lecture, discussion, and project-based learning projects. (Degree Credit) (CSU)

DRON 145 F Beginning ROV Piloting

3 Units

36 hours lecture and 54 hours lab per term. This course introduces students to the fundamental concepts, techniques, and skills required for piloting remotely operated vehicles (ROVs). Emphasizing workforce development, the course prepares students for entry-level roles in industries such as marine research, offshore energy, underwater construction, and environmental monitoring. (Degree Credit) (CSU)

DRON 150 F Autonomous Industrial Inspection

3 Units

36 hours lecture and 54 hours lab per term. This course provides a comprehensive exploration of autonomous systems used for industrial inspections. Students will gain hands-on experience with advanced technologies, including robot, drone, and various sensors such as thermal imaging, ultrasonic, and audio visualizers. The course emphasizes the safe operation, integration, and application of these systems in diverse industrial environments. Students will develop skills in inspection planning, data acquisition, and analysis to produce actionable insights while adhering to industry safety standards and regulations. Designed for individuals pursuing careers in industrial maintenance and safety, the course provides students with the ability to execute real-world inspection scenarios. (Degree Credit) (CSU)

DRON 170 F Introduction to LiDAR Acquisition

3 Units

36 hours lecture and 54 hours lab per term. This course introduces students to LiDAR (Light Detection and Ranging) technology, focusing on data acquisition and processing for diverse applications. Students will explore drone-based and handheld LiDAR sensor systems, proper field acquisition techniques, and advanced data processing workflows to create point clouds and 3D models. The course prepares students for real-world applications in industries such as environmental monitoring, construction, and analysis. (Degree Credit) (CSU)

DRON 180 F Introduction to Drone Technology**2 Units**

36 hours lecture per term. This course provides a comprehensive overview of drone technology, including the types of uncrewed aerial systems (UAS), their components, and their applications across various industries. Students will explore the regulatory landscape governing drone operations, including FAA Part 107 rules, as well as ethical considerations related to privacy and responsible use. The course emphasizes real-world use cases, emerging trends, and foundational knowledge to prepare students for further studies or careers in drone technology. (Degree Credit) (CSU)

DRON 181 F Drone Industry and Applications**2 Units**

36 hours lecture and 9 hours lab per term. This course provides students with an overview of the rapidly evolving drone industry, highlighting diverse applications across sectors such as agriculture, construction, environmental monitoring, public safety, photography, and more. Through a combination of lectures and hands-on activities, students will explore how drones are integrated into professional workflows, examine emerging trends, and gain practical experience with drone technologies and applications. (Degree Credit) (CSU)

DRON 190 F Counter Drone Operations**2 Units**

Formerly: TECH 159 F Counter Drone Operations 36 hours lecture per term. This course will teach the principles, techniques, technologies, and legal frameworks of counter-drone operations. Students will gain foundational knowledge in drone threat assessment, identification techniques, mitigation technologies, and the policies governing counter-drone activity. The course also explores the roles of authorized federal, state, and local agencies in the regulation and execution of counter-UAS (Uncrewed Aircraft Systems) operations. (Degree Credit) (CSU)

DRON 198 F Special Topics in Drone and Autonomous Systems**3 Units**

54 hours lecture per term. This course is designed to expose students to specialized skills in drone and autonomous systems. This course offers the student opportunity for specialized training in greater depth than can be offered in a general course. Topics will vary from semester to semester depending on new developments in industry, and need for specialized training. See class schedule for current seminar offerings. (Degree Credit) (CSU)

DRON 201 F Advanced Drone Piloting Skills**2 Units**

Prerequisite(s): DRON 101 F or DRON 105 F, with a grade of C or better

18 hours lecture and 54 hours lab per term. In this course, students will learn advanced drone piloting techniques including autonomous flight, larger aircraft, enhanced safety practices, first person view (FPV) piloting, and more. Students will fly to NIST and AUVSI Trusted Operator standards for certification. (Degree Credit) (CSU)

DRON 210 F Extended Drone Operations and Part 108**3 Units**

Prerequisite(s): DRON 101 F or DRON 105 F, with a grade of C or better

54 hours lecture per term. This course provides advanced training in drone operations, focusing on Beyond Visual Line of Sight (BVLOS) and autonomous flight technologies. Students will learn the regulatory, technical, and safety considerations necessary for extended drone missions. The hands-on experience with autonomous drone operations, preparing students for professional roles in the rapidly expanding field. (Degree Credit) (CSU)

DRON 220 F Drone as First Responder**3 Units**

36 hours lecture and 54 hours lab per term. This course provides comprehensive training on the use of drones in public safety applications, including law enforcement, firefighting, and emergency medical services. Students will learn to operate piloted and autonomous drone systems, including "drone-in-a-box" technology, while learning regulatory compliance, operational planning, and integration with real-time crime center (RTCC) workflows. Emphasis is placed on advanced flight operations, multi-agency coordination, and the application of drones in emergency and disaster response scenarios. (Degree Credit) (CSU)

DRON 240 F Advanced Drone Maintenance**3 Units**

Prerequisite(s): DRON 140 F with a grade of C or better

18 hours lecture and 108 hours lab per term. This advanced course provides practical experience in maintaining and troubleshooting drone flight control and electrical systems. Students will explore system diagnostics, repair techniques, and integration of advanced components. This hands-on laboratory course focuses on enhancing proficiency in the maintenance and optimization of drones for professional use. This course prepares students for careers in drone maintenance and technical support roles. (Degree Credit) (CSU)

DRON 245 F Advanced ROV Piloting and Operations**3 Units**

Prerequisite(s): DRON 145 F with a grade of C or better

18 hours lecture and 108 hours lab per term. This course provides advanced training in piloting and operating Remotely Operated Vehicles (ROVs) for underwater applications. Students will gain hands-on experience in advanced navigation techniques, sensor integration, data collection, and mission planning. The course emphasizes workforce readiness by covering critical areas such as maintenance, troubleshooting, safety protocols, and compliance with industry regulations. Students will be prepared for careers in industries including marine research, underwater construction, oil and gas, and environmental monitoring. (Degree Credit) (CSU)

DRON 255 F Applied Drone Lab**2 Units**

Advisory: CIS 201 F or ENGR 105 F or TECH 131 F

18 hours lecture and 54 hours lab per term. In this course, students will learn the basics of unmanned systems and how they work. Students will create a functioning aerial, terrestrial or submersible system. (Degree Credit) (CSU)

DRON 260 F Multispectral and Hyperspectral Sensing with Drones**3 Units**

45 hours lecture and 27 hours lab per term. This course will teach students how to capture and gain experience in the proper use of multispectral and hyperspectral imaging methods of remote imaging for various applications including agriculture, inspection, surveying, and many others. (Degree Credit) (CSU)

DRON 265 F Drone Spraying Operations and Certification Training**3 Units**

36 hours lecture and 54 hours lab per term. This course provides in-depth training on the operation of drones for agricultural and pest control spraying applications. The course covers essential topics such as pesticide handling, flight planning, drone system components, safety protocols, and regulatory compliance. Students will gain hands-on experience in aerial spraying operations and prepare for the FAA Part 137 certification and the California unmanned pest control aircraft pilot's certificate. This course equips students with the knowledge and skills necessary to safely and efficiently conduct drone-based spraying missions in compliance with federal and state regulations. (Degree Credit) (CSU)

DRON 270 F Advanced LiDAR Acquisition**3 Units**

Prerequisite(s): DRON 170 F with a grade of C or better. 18 hours lecture and 108 hours lab per term. This advanced course provides in-depth, hands-on training in drone-based LiDAR data acquisition and processing. Students will master mission planning, sensor calibration, and advanced techniques for generating and analyzing point clouds. Emphasis is placed on real-world applications, including creating high-precision 3D models and analyzing LiDAR data for industry-specific challenges. This course includes fieldwork, lab-based data processing, and project-based assessments. (Degree Credit) (CSU)

DRON 305 F Drone Sensor Technology and Applications**3 Units**

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses
54 hours lecture per term. This course focuses on providing students with a deep understanding of drone sensor technologies, their specifications, data acquisition techniques, and real-world applications. The course combines theoretical knowledge with hands-on experiences, enabling students to develop the skills necessary for a career in drone technology and autonomous systems. (Degree Credit) (CSU)

DRON 320 F Safety Management Systems for Drone and Autonomous Technology**3 Units**

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses
54 hours lecture per term. This course explores the understanding of safety management systems in the context of drones and autonomous technology. The course emphasizes the integration of Federal Aviation Administration (FAA) Safety Management Systems (SMS) and Occupational Safety and Health Administration (OSHA) standards. Students will explore the intricacies of creating and sustaining a safety-oriented culture while gaining practical insights into risk assessment, incident investigation, and emergency response planning. (Degree Credit) (CSU)

DRON 340 F Advanced Drone Maintenance and Aerodynamic Systems**3 Units**

Prerequisite(s): DRON 140 F with a grade of C or better and admission into baccalaureate degree program upon completion of all required lower division courses
18 hours lecture and 108 hours lab per term. This course is designed to equip students with advanced skills in drone maintenance and study the nuances of autonomous systems. Students will gain a deep understanding of avionics in uncrewed aerial systems, to help them emerge as proficient technicians capable of addressing complex systems in drone technology. (Degree Credit) (CSU)

DRON 350 F Drone Law**3 Units**

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses
54 hours lecture per term. This course is a comprehensive exploration of laws, regulations, principles, and case studies related to drones and autonomous systems. This course is designed to equip students with a deep understanding of the legal considerations in this rapidly advancing field. Students analyze how laws are applied in contemporary situations and learn to make distinctions between ethical and legal issues. (Degree Credit) (CSU)

DRON 370 F Drone LiDAR Application and Operations**3 Units**

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses
54 hours per term. This course provides comprehensive training in the principles and practical applications of Light Detection and Ranging (LiDAR) technology using drones. Students will gain hands-on experience in LiDAR data acquisition and processing, enabling them to create detailed point clouds and accurate 3D models. This course aims to equip students with the practical skills and theoretical knowledge necessary to leverage drone-based LiDAR technology in their professional pursuits. (Degree Credit) (CSU)

DRON 380 F Advanced Drone Operations**3 Units**

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses
36 hours lecture and 54 hours lab per term. This course is designed to equip students with the essential skills and knowledge needed to excel in the dynamic field of unmanned aerial systems and autonomous technologies. This course emphasizes practical experience in using and implementing a variety of drones for larger commercial purposes. (Degree Credit) (CSU)

DRON 385 F Multiplatform Autonomous Operations and Management**3 Units**

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses
54 hours lecture per term. This course provides a comprehensive exploration of autonomous systems, spanning terrestrial, maritime (surface and subsurface), and aerial platforms. Students will gain practical knowledge and skills in the operations and management of autonomous systems, focusing on tasks such as data acquisition, inspection, scanning, and other relevant applications. The course blends theoretical foundations with hands-on experiences, preparing students for dynamic careers in the rapidly evolving field of autonomous technology. (Degree Credit) (CSU)

DRON 415 F Introduction to Large Drone Operations**3 Units**

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses
54 hours lecture per term. This course introduces students to and trains them to operate and manage unmanned aerial vehicles (UAVs) weighing 55 pounds and over. This comprehensive program provides a foundational understanding of the unique challenges and opportunities associated with large drone operations. (Degree Credit) (CSU)

DRON 450 F Drone Operations Management**3 Units**

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses
54 hours lecture per term. This course provides students with a comprehensive understanding of the principles of operational management and project management in the context of drone operations. The course emphasizes professionalism, leadership, and operational safety, preparing students to effectively manage drone-related projects and operations in a variety of settings. Students will explore the intricacies of managing teams, ensuring safety compliance, and leading projects that involve advanced drone technologies. Students will work to earn their Project Management Professional Certificate to better prepare them for managerial operational positions. (Degree Credit) (CSU)

DRON 480 F Drone Practicum

4 Units

Prerequisite(s): Admission into baccalaureate degree pilot program upon completion of all required lower division courses

18 hours lecture and 162 hours lab per term. This course is a culminating capstone experience designed to provide students with hands-on, real-world application of the skills acquired throughout their study in the Drone and Autonomous Systems degree program. This intensive course offers an opportunity for students to engage in practical projects at designated field sites, fostering the continued development and refinement of their skills in drone technology and applications. Students will leverage the knowledge gained from their degree program to address complex challenges and contribute to the growing field of drone technology. (Degree Credit) (CSU)