

Uncrewed and Autonomous Systems (UNSY)

UNSY 100 Remote Pilot Operations 2 Credits (2,0)

Complete the FAA Part 107 Remote Pilot Certification. Federal Air Regulations, National Airspace System, Aviation Weather, Flight Safety, Airworthiness, Aeronautical Decision-Making.

Course Offered at: Daytona Beach

UNSY 125 Private and UAS Pilot Operations 3 Credits (5,0)

Develops the aeronautical knowledge for FAA-approved UAS commercial operations; preparation for FAA Private Pilot Knowledge Test (PPKT); aviation regulations, safety, pre-solo operations, cross-country planning, airspace, chart use, communications, weather, performance, weight and balance, aerodynamics, decision-making with UAS emphasis. Topics include: aviation regulations, safety, cross-country planning, airspace, weather, aircraft performance, aerodynamics and decision making centered around unmanned systems operations.

Course Offered at: Daytona Beach, Prescott

UNSY 199 Special Topics in Uncrewed Systems 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in uncrewed systems.

Course Offered at: Daytona Beach, Prescott

UNSY 201 Primary UAS Flight Operations 1 Credit (0,1)

Primary principles of solo flight operations for UAS. Focus on maneuvers, safety, aeronautical decision-making, and remote-pilot resource management.

Course Offered at: Daytona Beach

UNSY 205 Applied Physics for Uncrewed Systems 3 Credits (3,0)

Physics foundation for UAS applications, including sensor technology, communication, and control interfaces. Topics include particle theory, wave propagation, and signal processing.

Course Offered at: Worldwide

UNSY 220 Uncrewed Aircraft Systems 3 Credits (3,0)

Survey of uncrewed aircraft systems (UAS); military and commercial history; growth; UAS applications; basic acquisition, use, operation of UAS with emphasis on operations.

Course Offered at: Daytona Beach, Prescott, Worldwide, Asia

UNSY 222 Uncrewed Aircraft Systems Security 3 Credits (3,0)

Concepts of UAS security and protection; security engineering, vulnerability, malicious attack; strategies for protecting systems and assets; implications of ignoring security concerns.

Daytona Beach Prerequisites: UNSY 220

Course Offered at: Daytona Beach, Worldwide

UNSY 235 sUAS Flight and Mission Planning 3 Credits (3,0)

Flight and mission planning in support of task-oriented flying operations; tools, methods, and skills used to support selection, configuration, and application processes during planning, pre-flight, inflight (monitoring and data-gathering), post-flight, and post-processing procedures. Current sUAS systems and operating requirements; navigation concepts and components; system packages that are unique to the environment in which they operate.

Prerequisites: UNSY 322

Corequisites: UNSY 235L

Course Offered at: Worldwide, Asia

UNSY 235L sUAS Flight and Mission Planning Laboratory 1 Credit (0,1)

Laboratory focusing on flight planning techniques and procedures for UAS operations.

Prerequisites: UNSY 322

Corequisites: UNSY 235

Course Offered at: Worldwide, Asia

UNSY 236 Uncrewed Aircraft Systems Operation and Cross-Country Data Entry 3 Credits (3,0)

Provides the core understanding of technologies of uncrewed aircraft systems; design concepts, powerplants, control systems, communication technologies; technical capabilities, best applications, operational practices for cross-country flight planning. Emphasis on modern UAS platforms.

Prerequisites: UNSY 220

Course Offered at: Daytona Beach, Prescott

UNSY 237 Dronealism and Cinematography 3 Credits (1.5,1.5)

UAS utilization and techniques for creating, producing, editing, planning, executing cinematic sequences; TV, film, broadcast media; advertisement techniques, processes, and functions to meet industry requirements in aerial video and photography.

Prerequisites: UNSY 100 or UNSY 125 and UNSY 220

Course Offered at: Daytona Beach, Prescott

UNSY 238 Concepts of Advanced Urban Air Mobility 3 Credits (3,0)

Emerging technology and foundational concepts of advanced air mobility. Advanced air mobility concept of operations; autonomous technology, aerial vehicle development, use cases, UAM structure, regulation, implementation plan. Capabilities and limitations of AAM technology; potential implications of integrating advanced air mobility into National Airspace System.

Course Offered at: Daytona Beach, Prescott

UNSY 241 UAS Systems Architecture and Integration 3 Credits (3,0)

Autonomous aerial vehicle systems; ground control systems, communications, datalinks, airframe, propulsion, navigation, flight control, autopilot, electrical, sensors, payload; UAS system integration, component interoperability, effects on system performance, capabilities, limitations.

Prerequisites: UNSY 100 or UNSY 125 and UNSY 220

Course Offered at: Daytona Beach

UNSY 299 Special Topics in Uncrewed Systems 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in uncrewed systems.

Course Offered at: Daytona Beach, Prescott, Worldwide

UNSY 301 UAS Mapping Applications and Data Collection 1 Credit (0,1)

Introduction to geospatial data acquisition using UAS; data post-processing and synthesis. Emphasis on creating usable geospatial products.

Prerequisites: UNSY 201

Course Offered at: Daytona Beach

UNSY 311 Uncrewed Ground Systems and Applications 3 Credits (3,0)

Concepts and technologies for uncrewed ground systems (UGS); control fundamentals; mobility methods; sensor systems; applications in agriculture, search and rescue, firefighting, construction, mining. Tools for developing UGS operations in terrestrial environments.

Course Offered at: Worldwide

UNSY 313 Uncrewed Maritime Systems and Applications 3 Credits (3,0)

Fundamental concepts and technologies for uncrewed maritime systems (UMS); control systems; surface and underwater methods; sensor systems; applications in search and locate, inspection, and construction. Tools for developing UMS operations in marine environments.

Course Offered at: Worldwide

UNSY 317 UAS Networking 3 Credits (3,0)

The study of information technology, communications, frequency spectrum in UAS; signal processing, communications, interfaces, data links, FCC regulations, interoperability, communication standards; tools and methods for uncrewed systems operations through communication and information processing.

Worldwide Prerequisites: UNSY 205

Course Offered at: Prescott, Worldwide

UNSY 318 UAS Robotics 3 Credits (3,0)

Technologies, systems, and control of uncrewed aircraft; exploration of UAS, sensors, integration, robotic control; guided discussions, hands-on learning, basic programming.

Daytona Beach Prerequisites: UNSY 220

Prescott Prerequisites: UNSY 220

Course Offered at: Daytona Beach, Prescott, Worldwide, Asia

UNSY 321 Uncrewed Systems Localization and Path Planning 3 Credits (3,0)

Localization, orientation, and navigation concepts for uncrewed systems. Visual, distance, and inertial navigation methods; computational techniques for vehicle positioning.

Prerequisites: UNSY 205

Course Offered at: Worldwide

UNSY 322 Operational and Business Aspects of Uncrewed Aircraft Systems 3 Credits (3,0)

Management and leadership in uncrewed aviation; UA technologies, program development, project management.

Daytona Beach Prerequisites: UNSY 220

Prescott Prerequisites: UNSY 220

Course Offered at: Daytona Beach, Prescott, Worldwide, Asia

UNSY 323 Crew Resource Management for UAS 3 Credits (3,0)

Principles of organizational behavior, interpersonal skills, behavioral dynamics for UAS crews analyzing the aspects of: human error, communication, problem-solving, workload management, situational awareness; focus on teleoperation, automation in UAS.

Prerequisites: UNSY 220

Course Offered at: Daytona Beach, Prescott

UNSY 324 Global Uncrewed Aircraft Systems (UAS) Regulations 3 Credits (3,0)

Introduces students to U.S. and international statutes, treaties and regulations for UAS operations; emphasis on current and proposed US state-level laws and international laws and regulations dealing with uncrewed aviation and airspace characteristics of different nations.

Course Offered at: Daytona Beach, Prescott, Worldwide

UNSY 325 Uncrewed Systems Testing and Inspection 3 Credits (3,0)

Testing and inspection methods for uncrewed systems; quality assurance; reliability testing; operational readiness. Develop strategies, create plans, and justify recommendations.

Course Offered at: Worldwide

UNSY 329 Uncrewed Systems Computation and Programming 3 Credits (3,0)

Computational technologies and programming for uncrewed systems. Development of programming solutions, debugging, and optimization for task-specific applications.

Prerequisites: UNSY 205 and UNSY 318

Course Offered at: Worldwide

UNSY 368 UAS Sensing Systems 3 Credits (3,0)

Remote sensing principles; operation, design of equipment for uncrewed, autonomous platforms; mission requirements, system selection; sensor acquisition, procurement, installation limitations, data interpretation.

Prerequisites: UNSY 220

Course Offered at: Daytona Beach

UNSY 390 UAS Practicum I 3 Credits (3,0)

Practical experience piloting UAS through individual or group projects. Focus on regulations, policy, data management, and crew resource management.

Course Offered at: Daytona Beach

UNSY 391 Application of UAS Technology 3 Credits (3,0)

Training UAS operators in technology application for commercial objectives; geographic information systems, payload data extraction, imagery processing, and synthesizing data into commercial products.

Prerequisites: UNSY 220

Course Offered at: Daytona Beach, Prescott

UNSY 399 Special Topics in Uncrewed Systems 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in uncrewed systems.

Course Offered at: Daytona Beach, Prescott, Worldwide

UNSY 401 Advanced UAS Flight Operations 1 Credit (0,1)

Advanced principles of UAS flight operations focusing on the further development of skills obtained through initial UAS operational performance standards.

Prerequisites: UNSY 301

Course Offered at: Daytona Beach

UNSY 402 Advanced UAS Videography 3 Credits (3,2.5)

Emphasis on hands-on advanced videography techniques for UAS videography; recording ultra-high-definition EO footage, audio capturing, lighting, editing, color grading; applications in inspection, commercial advertisement, real estate, movie and television industry and social media.

Prerequisites: UNSY 237

Course Offered at: Prescott

UNSY 403 Uncrewed Sensing Systems 3 Credits (3,0)

Direct experience in complex sensor utilization, mission planning and mission execution. Course will teach the proper sensor selection to carryout specifics high-level data gathering exercises. Students will identify UAS sensors and specific uses in various applications.

Daytona Beach Prerequisites: UNSY 220

Prescott Prerequisites: UNSY 220

Course Offered at: Prescott, Worldwide, Asia

UNSY 405 Uncrewed Systems Operational Environments and Conditions 3 Credits (3,0)

Environmental factors affecting uncrewed systems performance: temperature, terrain, weather, pressure, range, and endurance. Analysis of conditions for optimal operations.

Course Offered at: Worldwide

UNSY 415 Uncrewed Space Systems and Application 3 Credits (3,0)

Fundamental technologies for uncrewed space systems. Craft design, space navigation, orbital maneuvering, and payload selection. Exploration of extraterrestrial bodies.

Course Offered at: Worldwide, Asia

UNSY 416 UAS Field Service and Sustainment 3 Credits (3,0)

Maintenance, inspection, troubleshooting, repair of UAS primary and subsystems.

Prerequisites: UNSY 220

Course Offered at: Daytona Beach

UNSY 421 Uncrewed Systems Mission Planning 3 Credits (3,0)

Task-oriented uncrewed systems employment. Mission planning; payload selection; system coordination and contingency planning; scenario-based application of navigational knowledge.

Prerequisites: UNSY 321 and UNSY 403 and UNSY 405

Course Offered at: Worldwide

UNSY 423 AAM Infrastructure Development and Modeling 3 Credits (3,0)

Infrastructure for integrating UAS and advanced air mobility into NAS; ATM systems, UTM, airspace implications, ground support, vertiport design.

Prerequisites: UNSY 220

Course Offered at: Daytona Beach

UNSY 431 Uncrewed Systems Human Factors Considerations 3 Credits (3,0)

Human factors in uncrewed systems. Human-machine interfaces, cognitive processing, ergonomics, command and control, and regulatory issues affecting system performance.

Course Offered at: Worldwide, Asia

UNSY 432 Deploying UAS in Public Safety Flight Operations 3 Credits (3,0)

Conducting flight missions for public safety; operational preparation, deployment strategies, risk assessment, safety management systems, operational response procedures.

Course Offered at: Daytona Beach

UNSY 435 sUAS Practical Application and Assessment 3 Credits (3,0)

Safe and effective performance of UAS operations for research and educational purposes. Advanced control techniques, flight planning, and real-world scenario assessment.

Prerequisites: UNSY 235

Course Offered at: Worldwide, Asia

UNSY 440 Advanced Flight Operations 3 Credits (3,0)

Advanced UAS flight operations; task-specific scenarios; application of planning, safety, and legal operation practices in real-world settings.

Prerequisites: UNSY 435

Course Offered at: Worldwide

UNSY 473 Operational Applications in Uncrewed Aircraft Systems 3 Credits (3,0)

Professional/commercial use of UAS; industry applications, program management, technology adaptation, regulation; safe UAS integration into NAS.

Prerequisites: UAS Major and UNSY 403

Course Offered at: Daytona Beach, Prescott

UNSY 475 UAS Mission Execution 3 Credits (1,4)

Provides practical field experience for students majoring in Uncrewed Aircraft Systems (UAS) including UAS flights in support of actual commercial or civil operations in the National Airspace (NAS). Students will select the UAS sensors appropriate for each mission, plan and brief each mission, collect and analyze data gather from each mission. Students will demonstrate proper preflight, ATC clearance, route planning, safety of flight in the NAS, lost link scenarios, post-flight and data information interpretation. Students completing this course will be trained to successfully enter the commercial or civil UAS market while gathering real project management experience.

Prerequisites: UAS Major, UNSY 403 and UNSY 473

Course Offered at: Prescott

UNSY 490 UAS Practicum II 3 Credits (3,0)

Advanced UAS projects to enhance industry skills. Exploration of regulations, flight opportunities, and data post-processing.

Course Offered at: Daytona Beach

UNSY 491 Operational Applications in Uncrewed Systems 3 Credits (3,0)

Industry growth and challenges in uncrewed systems across air, space, ground, and maritime domains. Focus on autonomy, integration, communication, and regulatory issues.

Course Offered at: Worldwide

UNSY 499 Special Topics in Uncrewed Systems 1-6 Credit (1-6,0)

Individual, independent, or directed studies of selected topics in uncrewed systems.

Course Offered at: Daytona Beach, Prescott, Worldwide