B.S. in Uncrewed Aircraft Systems

Uncrewed Aircraft Systems (UAS) is the future of aviation. U.S. and foreign governments are continually releasing new rules allowing more and more integration of commercial "drone" operations (also known as uncrewed aircraft systems or UAS) into their airspace. These commercial drones are capable of obtaining high-resolution imagery and rich data sets for a variety of applications, from real estate surveys, utility and construction site surveys, and agricultural applications to forestry and **public safety jobs**. UAS also has wide ranging benefits in air delivery logistics and public transportation. The UAS industry is growing exponentially! Tens of thousands of UAS professionals will be needed who are capable of planning and executing UAS missions and delivering the end products to a variety of customers. Focusing on commercial and civil applications, the Uncrewed Aircraft Systems degree empowers graduates to meet current and future employment demands. The UAS degree qualifies students as subject matter experts in UAS data collection, retrieval, editing, display, and delivery. Students also gain a broad understanding of business, aviation regulations, technology, meteorology, **Geographic Information System (GIS)**, and security associated with the UAS industry. All students in the UAS program become trained and licensed small UAS (sUAS) operators by ERAU UAS Flight Instructors to earn their FAA Part 107 Remote Pilot In-Command (RPIC) certificate. Students learn to fly a variety of **fixed-wing, vertical takeoff and landing (VTOL)** and **multi-rotor** UAS and learn to use a variety of useful software suites. The UAS program is working with several public sector and commercial partners to enable students to obtain the most up-to-date and hands-on experience in operations planning and executing actual UAS missions and learning from the industry.

Admission Requirements

Students entering this program should have a basic background in math and physics. Students wishing to strengthen their background in math and the basic sciences before enrolling in the prescribed courses should contact the department chair or the program coordinator for guidance. We welcome students from all nationalities to join the B.S. in Uncrewed Aircraft Systems degree.

Students will:

- Use uncrewed aircraft systems properly by formulating and executing safe and efficient mission plans while being able to adapt to adverse and emergency situations.
- Compile imagery and other collected data from sensors used by several uncrewed aircraft systems and create products that effectively utilize the data obtained using on-board sensors.
- Show evidence of advanced concepts of uncrewed aircraft systems, aerospace, and aeronautics to solve problems commonly found in the small uncrewed aircraft systems industry.
- Demonstrate a basic understanding and compliance with national and international legislation and law pertaining to uncrewed aircraft.
- Show evidence of basic concepts in uncrewed aircraft systems safety and exercise safe practices.
- Show evidence of sound, ethical, management principles within the uncrewed aircraft industry and formulate solutions to contemporary issues facing the uncrewed aircraft industry.
- Communicate effectively using clear and properly formatted technical writing, verbal communication, and visual displays.

Degree Requirements

The Bachelor of Science in Uncrewed Aircraft Systems may be attained in eight semesters. To earn the degree, successful completion of 120 credit hours is required.

Program Mission Statement

The Uncrewed Aircraft Systems (UNC) degree will provide the essential aeronautical, business, and legal knowledge and skills to obtain a successful career in the UAS industry. Graduates will be prepared for successful careers as Remote Pilots in Command (PICs), observers, payload operators, and/or operational managers of governmental and private sector UAS applications. Experience will be gained in aerial data collection, secure operations, long duration operations, highly detailed operations, and autonomous operations. Graduates will be prepared to meet current industry requirements with an emphasis on future industry developments such as Beyond Visual Line-of-Sight (BVLOS) operations and the use of multiple small UAS at the same time.

Program Requirements

General Education

Embry-Riddle degree programs require students to complete a minimum of 36 hours of General Education coursework. For a full description of Embry-Riddle General Education guidelines, please see the General Education section of this catalog.

Students may choose other classes outside of their requirements, but doing so can result in the student having to complete more than the degree's 120 credit hours. This will result in additional *time and cost* to the student.

Communication Theory and Skills	9
Computer Science/Information Technology	3
Mathematics	6
Physical and Life Sciences (Natural Sciences)	6
Humanities and Social Sciences	12
3 hours of lower-level Humanities	
3 hours of lower-level Social Science	
3 hours of lower-level or upper-level Humanities or Social Science	
3 hours of upper-level Humanities or Social Science	
Total Credits	**36**

Uncrewed Aircraft Systems Core (101-104 Credits)

The following course of study outlines the quickest and most cost-efficient route for students to earn their B.S. in Uncrewed Aircraft Systems. Students are encouraged to follow the course of study to ensure they complete all program required courses and their prerequisites within four years.

Courses in the core with a # will satisfy your general education requirements.

AS 121 or AS 125	Private Pilot Operations Private and UAS Pilot Operations	3-5
AS 220	Uncrewed Aircraft Systems	3
AS 235	Uncrewed Aircraft Systems Operation and Cross-Country Data Entry	3
AS 309	Aerodynamics	3
AS 310	Aircraft Performance	3
AS 322	Operational and Industrial Aspects of UAS	3
AS 323	Crew Resource Management for UAS	3
AS 324	Global Unmanned Aircraft Systems (UAS) Regulations	3
AS 325	Dronealism and Cinematography	3
AS 403	Uncrewed Sensing Systems	3

AS 405	Aviation Law	3
AS 473	Operational Applications in Uncrewed Aircraft Systems	3
AS 475	UAS Mission Execution ^	3
AS 495W	Advanced UAS Videography	3
AT 200	Air Traffic Basics I	3
BA 201	Principles of Management	3
CI 310	Intelligence, Surveillance and Reconnaissance **	3
COM 122	English Composition #	3
EC 200	An Economic Survey (OR Lower-Level Social Science) #	3
or EC 210	Microeconomics	
or EC 211	Macroeconomics	
General Education - Communications Elective #		6
General Education - Lower-Level Humanities #		3
GEO 210	Introduction to Geographic Information Systems	3
GEO 310	Advanced Geographic Information Systems	3
IT 109	Introduction to Computers and Applications #	3
or CS 118	Fundamentals of Computer Programming	
SF 210	Introduction to Aerospace Safety	3
MA 111	Pre-Calculus for Aviation #	3
or MA 120	Quantitative Methods I	
or MA 140	College Algebra	
MA 112	Applied Calculus for Aviation #	3
or MA 220	Quantitative Methods II	
or MA 241	Calculus and Analytical Geometry I	
PS 113	Introductory Physics I #	3
PSY 222	Introduction to Industrial/Organizational Psychology (OR Lower-level or Upper-level Humanities or Social Science) *#	3
PSY 326	Occupational Health & Performance (OR Upper-level Humanities or Social Science) **#	3
or PSY 345	Training and Development	
UNIV 101	College Success	1
WX 201	Survey of Meteorology #	3
WX 203L	Survey of Meteorology Laboratory #	1
or PS 113L	Introductory Physics I Laboratory	
WX 301	Aviation Weather	3

Specified Electives (12 Credits)

Choose a total of 4 courses from the list of courses below:

AT 305	Introduction to Terminal Radar Operations	3
AT 401	Advanced Terminal Radar Operations	3
BA 308	Public Administration	3
BA 311	Marketing	3
BA 328	Professional Consulting	3
BA 337	Entrepreneurship	3
BA 421	Small Business Management	3
SF 320	Human Factors in Aviation Safety	3
SIS 315	Studies in Global Intelligence I	3
SIS 323	Intelligence and Technology	3
SIS 420	Aviation Security and Technology	3
SIS 422	Homeland Security and Technology	3
SIS 430	Emergency Management and Contingency Planning	3
WX 270	Weather Information Systems **	3

WX 364		
WX 365	Satellite and Radar Weather Interpretation *	3

Open Electives (4-7)

Open Electives	4-7

Total Credits	**120**

^ The UAS Capstone (AS 475) is intended to be a culminating experience for the Bachelor of Science in Uncrewed Aircraft Systems degree and, therefore, will be the last course taken in the UAS core after completing AS 473 UAS Flight Simulation.
* Offered in Fall Only
** Offered in Spring Only
   PS 113L Spring Run Only
\# General Education Course

All Army ROTC students are required to complete SS 321 - U.S. Military History 1900-Present (3 credits) in order to commission.

Uncrewed Aircraft Systems - General

Freshman Year

Fall		Credits
AS 121	Private Pilot Operations	3-5
or AS 125	Private and UAS Pilot Operations	
COM 122	English Composition	3
IT 109	Introduction to Computers and Applications	3
or CS 118	Fundamentals of Computer Programming	
MA 111	Pre-Calculus for Aviation	3
or MA 120	Quantitative Methods I	
or MA 140	College Algebra	
UNIV 101	College Success	1
	Credits Subtotal	**13.0-15.0**
Spring		
BA 201	Principles of Management	3
	Lower-Level Humanities	3
MA 112	Applied Calculus for Aviation	3-4
or MA 220	Quantitative Methods II	
or MA 241	Calculus and Analytical Geometry I	
PS 113	Introductory Physics I	3
WX 201	Survey of Meteorology	3
WX 203L	Survey of Meteorology Laboratory	1
or PS 113L	Introductory Physics I Laboratory	
	Credits Subtotal	**16.0-17.0**

Sophomore Year

Fall		
AS 220	Uncrewed Aircraft Systems	3
AS 309	Aerodynamics	3
	Communication Theory and Skills Elective	3
PSY 222	Introduction to Industrial/Organizational Psychology (OR Lower-level or Upper-level Humanities or Social Science)	3
WX 301	Aviation Weather	3
	Credits Subtotal	**15.0**
Spring		
AS 235	Uncrewed Aircraft Systems Operation and Cross-Country Data Entry	3
AS 310	Aircraft Performance	3
	Communication Theory and Skills Elective	3
SF 210	Introduction to Aerospace Safety	3

	Specified Elective	3
	Credits Subtotal	**15.0**
Junior Year		
Fall		
AS 322	Operational and Industrial Aspects of UAS	3
AT 200	Air Traffic Basics I	3
EC 200	An Economic Survey (OR Lower-Level Social Science Elective)	3
or EC 210	Microeconomics	
or EC 211	Macroeconomics	
GEO 210	Introduction to Geographic Information Systems	3
	Open Elective	3
	Credits Subtotal	**15.0**
Spring		
AS 323	Crew Resource Management for UAS	3
AS 325	Dronealism and Cinematography	3
AS 403	Uncrewed Sensing Systems	3
GEO 310	Advanced Geographic Information Systems	3
	Specified Elective	3
	Credits Subtotal	**15.0**
Senior Year		
Fall		
AS 324	Global Uncrewed Aircraft Systems (UAS) Regulations	3
AS 473	Operational Applications in Uncrewed Aircraft Systems	3
AS 495W	Advanced UAS Videography	3
CI 310	Intelligence, Surveillance and Reconnaissance	3
	Specified Elective	3
	Credits Subtotal	**15.0**
Spring		
AS 405	Aviation Law	3
AS 475	UAS Mission Execution	3
	Open Electives	1-4
PSY 326	Group and Team Behavior (OR Upper-Level Humanities or Social Science)	3
or PSY 345	Training and Development	
	Specified Elective	3
	Credits Subtotal	**13.0-16.0**
	Credits Total:	**120**

GIS and Remote Sensing Certificate

The GIS and remote sensing certificate prepares students for employment in GIS and remote sensing-related careers. Due to its versatile use in many industries, the GIS certificate is open to all disciplines that use geospatial data to manage workflows, processes, policies, and high-level decision-making.

Students in this certification program will learn the most common GIS and remote sensing workflows to generate, process and apply geospatial data via in-depth, hands-on experiences using state-of-the-art GIS software. Emphasis is placed on the practical aspects of working with a GIS using easy-to-understand, step-by-step tutorials and instructor demonstrations.

Students who successfully complete the GIS and remote sensing certificate will have the necessary skills to compete and work in the field of GIS and remote sensing in both the public and private sectors. Moreover, GIS and remote sensing skills earned through this certificate are useful in supporting capstone projects, master theses and can provide students with a robust foundation to engage in a research career.

Certification Requirements

To obtain the proposed GIS and Remote Sensing Certificate (a total of 12 CH), students will be required to take the following 4, 3-CH GEO courses:

GEO 210	Introduction to Geographic Information Systems	3
GEO 310	Advanced Geographic Information Systems	3
GEO 350	Introduction to Remote Sensing with GIS	3
GEO 450	Lidar Processing with GIS	3

The GEO courses in the GIS and Remote Sensing Certificate should be taken in the order outlined above, but it is not necessary, except for GEO 210 which is a course prerequisite for GEO 310, GEO 350 and GEO 495. The content of study in each GEO course participating in this certificate is described in each GEO course already offered.