Unmanned Aircraft Systems
ECE 4379, ECE 5379, CS 4331-003, ME 4330-002
Spring - 2025

2024 CATALOG DATA	An introduction to UAVs (drones) and their commercial and military applications. Topics include flight dynamics, electronic and mechanical components, sensor systems, and regulations.
RESOURCES	*Various*
INSTRUCTOR	Tim Dallas, Ph.D. – Professor of Electrical and Computer Engineering
OBJECTIVES	The course provides an introduction to Unmanned Aircraft Systems (drones) and their applications.
PREREQUISITES	2.5 TTU GPA; for engineering majors or department consent.
TOPICS	1. Flying a drone 2. Flight 3. Safety 4. Electronic, electrical, and mechanical components 5. Sensors 6. Imaging devices and systems 7. UAS applications 8. Federal and local regulations 9. Pilot certification
CLASS SCHEDULE	MWF: 9:00 am – 9:50 am
LOCATION	ECE 221
GRADING	Quizzes, Labs, & Homework: 25% MIDTERM Exam: 25% Final Project Presentations (Update and Final): 25% Final Exam (Mock UAS Pilot Certification Exam): 25%
Course Learning Outcomes	After completing the course, the student will : (1) understand how lift and propulsion are achieved for UAS, (2) understand required and optional components needed to achieve flight, control, and function, (3) evaluate the variety of UAS sizes, performance, prices, and features, (4) analyze how sensors and algorithms are used to achieve control and autonomy, (5) understand and analyze how UAS are implemented in various applications, and (6) understand steps required and knowledge needed to achieve UAS pilot certification.

Learning Outcome	ABET Outcomes	Assessment Method
(1) understand how lift and propulsion are achieved for UAS	1, 7	Quizzes, Homework, Labs Midterm Exam
(2) understand required and optional components needed to achieve flight, control, and function	2, 3, 5	Quizzes, Homework, Labs Midterm Exam Final Project
(3) evaluate the variety of UAS sizes, performance, prices, and features	1, 7	Quizzes, Homework, Labs Final Project
(4) analyze how sensors and algorithms are used to achieve control and autonomy	2	Quizzes, Homework Midterm Exam
(5) understand and analyze how UAS are implemented in various applications	3, 6	Quizzes Final Project
(6) understand steps required and knowledge needed to achieve UAS pilot certification.	4	Quizzes Final Exam

CONTRIBUTIONS TO PROFESSIONAL COMPONENT

This course prepares students for engineering practice by providing technology operation and application instruction. This course includes engineering topics and engineering design.

ADA

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodation to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in West Hall or call 806-742-2405.

ACADEMIC INTEGRITY STATEMENT

Academic integrity is taking responsibility for one's own class and/or course work, being individually accountable, and demonstrating intellectual honesty and ethical behavior. Academic integrity is a personal choice to abide by the standards of intellectual honesty and responsibility. Because education is a shared effort to achieve learning through the exchange of ideas, students, faculty, and staff have the collective responsibility to build mutual trust and respect. Ethical behavior and independent thought are essential for the highest level of academic achievement, which then must be measured. Academic achievement includes scholarship, teaching, and learning, all of which are shared endeavors. Grades are a device used to quantify the successful accumulation of knowledge through learning. Adhering to the standards of academic integrity ensures grades are earned honestly. Academic integrity is the foundation upon which students, faculty, and staff build their educational and professional careers. [Texas Tech University ("University") Quality Enhancement Plan, Academic Integrity Task Force, 2010]

RELIGIOUS HOLY DAY STATEMENT

"Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code §11.20. A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the

observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. A student who is excused under section 2 may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

CIVILITY IN THE CLASSROOM STATEMENT

Texas Tech University is a community of faculty, students, and staff that enjoys an expectation of cooperation, professionalism, and civility during the conduct of all forms of university business, including the conduct of student–student and student–faculty interactions in and out of the classroom. Further, the classroom is a setting in which an exchange of ideas and creative thinking should be encouraged and where intellectual growth and development are fostered. Students who disrupt this classroom mission by rude, sarcastic, threatening, abusive or obscene language and/or behavior will be subject to appropriate sanctions according to university policy. Likewise, faculty members are expected to maintain the highest standards of professionalism in all interactions with all constituents of the university (www.depts.ttu.edu/ethics/matadorchallenge/ethicalprinciples.php).

STATEMENT OF ACCOMMODATION FOR PREGNANT STUDENTS

Any pregnant student will be provided reasonable accommodations as would be provided to a student with a temporary medical condition including:

1. ability to maintain a safe distance from hazardous substances, areas, or activities
2. excused absences
3. ability to make up missed assignments or assessments
4. additional time for assignment completion; and access to instructional materials and recordings of classes for which the student has an excused absence

Any student who is pregnant or parenting a child up to age 18 may contact Texas Tech's designated Pregnancy and Parenting Liaison to discuss support available through the University. The Liaison can be reached by emailing titleix@ttu.edu or calling 742-7233. Additional information is available online.

AI USE

You are permitted to use ChatGPT and other artificial intelligence (AI) tools to assist you in gathering information and brainstorming ideas but you may not copy and paste information directly from the AI tool and present it as your own without citation. You are responsible for the information you submit based on an AI query and for assuring that it does not contain misinformation or unethical content and that it does not violate intellectual property laws. Your use of AI tools must be properly documented and cited appropriately for academic integrity. You are expected to include a disclosure statement at the end of your assignment describing which AI tool you used and how you used it. For example, "ChatGPT was used to draft about 50 percent of this paper and to provide revision assistance. AI-produced content was edited for accuracy and style."