Syllabus: ASEN 6519 Drone Remote Sensing

Contact Information

Instructor Name: Dr. Alia Khan

Email: alia.khan@colorado.edu

Office Hours: Tues 1 – 2pm.

Communication Policies

All official course materials and assignments will be managed via the course Canvas page. Student assignment submission will all be managed via Canvas as well. Make sure to enable notifications so you don't miss important announcements.

Please use Canvas to communicate with the professor and expect a response within 24 - 48 hours during regular business hours (M - F, ~8am - 5pm) . If you do not receive a response to your message within 48 hours, please message again with the heading "2nd inquiry: [original subject header]."

Course Description

Meeting Times: TR 11:30 – 12:45 pm

Meeting Location: AERO N240

Course Objectives

The course will be divided into three primary sections:

- FAA regulations and Pilot 107 Requirements
- Drone remote sensing data analysis
    - DEM creation using SfM photogrammetry
    - Multispectral data analysis for imaging of Earth's surface with drones
- Drone Applications and Final Project

Learning Objectives

At the end of the course, students should:

- Understand FAA regulations in order to pass the FAA UAS Part 107 Exam, should you decide to pursue it.
- Know how to safely plan and conduct drone flight missions.
- Be able to generate geospatial products (such as digital elevation models) using Structure From Motion (SfM) photogrammetry.
- Work with multispectral imagery and apply spectral indices to characterize features on Earth's surface.
- Design and executer an independent drone project.

Overarching learning objectives include:

Teamwork Skills: learn and practice effective teamwork skills; learn how to rely on other team members to give and receive help; demonstrate increased understanding of diversity, equity, and inclusion; and practice conflict resolution.

Communication Skills: develop technical writing and oral presentation skills; effectively communicate informal assignments (e.g.,'drones in the news'), as well as more formal results, (i.e., results of your final project to the class); learn and practice active listening skills.

Drone Remote Sensing Research Experience: define and refine research questions; determine where and where you can fly to collect data to answer research questions, define functional requirements and specifications (such as flight settings to achieve desired data outcomes); generate data, process and analyze data, discuss results and final conclusions.

Prerequisites: 5000-level coursework in ASEN.

Required Texts

All required texts are included within this canvas course.

Course Outline

See Schedule Page.

Method of Instruction

This course will be taught in person. Some lectures may be offered virtually, but there will be no recorded option. Students are expected to attend class in person, unless discussed with the instructor ahead of time. (Zoom can be arranged with advanced notice and a justified rationale for attending remotely).

That said, please do not come to class if you are ill or weather conditions make it unsafe for you to get to campus (e.g., severe snowstorm). If you must miss class for any reason (not feeling well, snowstorm, etc.), it will be excused if you message me before class time. If you cannot message me before class due to extreme circumstances, please message me as soon as you are able. Be sure also to clearly communicate absences with your final project team.

Student Responsibilities and Class Expectations

Preparation. Come to class having completed the reading and assignments for that day and be prepared to participate actively in class discussions and activities, as well as to listen carefully and respectfully to your colleagues. Please remember that the workload for this course is essential to reach the course goals. Much of what we do in class will require collaboration, so we will be creating opportunities for you to work together and serve as resources for each other's learning.

Preparation of Assignments. Since all of you are either active professionals, or are preparing to become ASEN professionals, you need to practice preparing documents that are ready for your audience - be it local community members, students, teachers, colleagues, clients, and supervisors to read. All email communications should be written as though you were communicating with a colleague, client, or supervisor. All assignments handed in should be carefully proofread and should contain no spelling or grammatical errors; multiple errors will impact your grade for that assignment.

Assignments

Biweekly Reading Discussion Posts (10%)

Readings will be provided on Canvas. You will be expected to answer a series of questions in the discussion post and come prepared to discuss the reading in class.

Weekly Drones in the News Assignment (15%)

Drone technology is rapidly advancing and becoming more prevalent in daily life. Here we will keep on top of current events through weekly discussion posts and class discussions based around those.

Midterm (25%)

Completion of a practice FAA Pilot 107 course to prepare you for becoming certified pilots.

Drone Data Analysis Project (25%)

The plan is to fly and collect data as a class for you to process. More details to come.

Final Group or Individual Project (25%)

After being guided through the process in the above assignment, you will split into groups to design, collect, and process your own data. If you have specific research goal related to your thesis work, there is potential to work alone as well. More details to come.

Submission Policies

Late Work Policy. Late work will not be accepted. If you miss a deadline due to extenuating circumstances, please plan on using one of your two late work passes at the end of this syllabus.

Grade Disputes. If you disagree with any graded item, please email me a PDF of the graded item, as well as a description of why you believe your question was incorrectly graded within one week of the date the graded assignment is returned.

Grading Criteria and Points Breakdown

This class emphasizes learning and feedback. The course grade will be based on a combination of group work and individual accomplishment.

Letter Grades

At the semester's end, your total numerical score is recorded as its letter grade equivalent. For example, the total numerical score of 87 out of 100 is recorded as a "B+." A total numerical score of 82 out of 100 is recorded as a "B." Please see the scale below. See also the University Credits and Grading Policy.

Grade Management

All grades will be managed through the CU Canvas website; accessed through http://canvas.colorado.edu.

Grading Scale

Grades will be assigned as follows

Table - Grading Scale

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Percentage Grade	93-100	90-93	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	<60

Community of Care

CU Boulder is committed to a community of care in which students are supported by faculty and staff throughout their college journey. You don't have to face academic challenges alone – CU and the college are here to help you learn and succeed in your coursework and campus life. Part of this community of care is your connection to faculty and staff across campus. As your instructor I am available for questions you may have about your educational journey. Along with other CU faculty and support staff, I may be reaching out to you (during our class and later in the semester) to invite you to connect.

University Policies

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the Honor Code may include but are not limited to: plagiarism (including use of paper writing services or technology [such as essay bots]), cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. Understanding the course's syllabus is a vital part in adhering to the Honor Code.

All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution: StudentConduct@colorado.edu. Students found responsible for violating the Honor Code will be assigned resolution outcomes from the Student Conduct &

Conflict Resolution as well as be subject to academic sanctions from the faculty member. Visit Honor Code for more information

Accommodation for Disabilities, Temporary Medical Conditions, and Medical Isolation

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or DSinfo@colorado.edu for further assistance. If you have a temporary medical condition, see Temporary Medical Conditions on the Disability Services website.

If you have a temporary illness, injury or required medical isolation for which you require adjustment, please contact Dr. Khan as soon as possible to make accommodations for alternate assignments or extended due dates for missed assignments. Work with your group to contribute remotely.

Accommodation for Religious Obligations

Campus policy requires faculty to provide reasonable accommodations for students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please communicate the need for a religious accommodation in a timely manner.

Preferred Student Names and Pronouns

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Classroom Behavior

Students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote, or online. Failure to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, marital status, political affiliation, or political philosophy.

For more information, see the classroom behavior policy, the Student Code of Conduct, and the Office of Institutional Equity and Compliance.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits protected-class discrimination and harassment, sexual misconduct (harassment, exploitation, and assault), intimate partner abuse (dating or domestic violence), stalking, and related retaliation by or against members of our community on- and off-campus. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who have been subjected to misconduct can contact OIEC at 303-492-2127 or email CUreport@colorado.edu. Information about university policies, reporting options, and OIEC support resources including confidential services can be found on the OIEC website.

Please know that faculty and graduate instructors are required to inform OIEC when they are made aware of incidents related to these concerns regardless of when or where something occurred. This is to ensure that individuals impacted receive outreach from OIEC about their options and support resources. To learn more about reporting and support for a variety of concerns, visit the Don't Ignore It page.

Mental Health and Wellness

The University of Colorado Boulder is committed to the well-being of all students. If you are struggling with personal stressors, mental health or substance use concerns that are impacting academic or daily life, please contact Counseling and Psychiatric Services (CAPS) located in C4C or call (303) 492-2277, 24/7.

Free and unlimited telehealth is also available through Academic Live Care. The Academic Live Care site also provides information about additional wellness services on campus that are available to students.

Acceptable Use of AI in this Class

Generative artificial intelligence tools—software that reproduces text, images, computer code, audio, video, and other content—have become widely available. Well-known examples include ChatGPT for text and DALL•E for images. This statement governs all such tools, including those released during our semester together.

Keep in mind that the goal of gen AI tools is to reproduce content that seems to have been produced by a human, not to produce accurate or reliable content; therefore, relying on a gen AI tool may result in your submission of inaccurate content. It is your responsibility—not the tool's—to assure the quality, integrity, and accuracy of work you submit in any college course.

You may use gen tools on specific assignments in this course, but their use is limited to the following particular tasks: coding and generating ideas or outlines for the projects. However, the final work must be student-generated. If you use gen AI tools on assignments in this class, document your usage with the Chicago Manual of StyleLinks to an external site. or appropriate citation guidelines for this course.

If gen AI tool use is suspected in completing assignments for this course in ways not explicitly authorized, I will follow up with you. I may contact the [Office of Student Conduct & Conflict Resolution](#) to report suspected [Honor Code](#) violations. In addition, you must be wary of unintentional plagiarism or data fabrication. Please act with integrity, for the sake of both your personal character and your academic record.

Please note, **Use of AI to write individual reflections is a violation of CU's honor code.**

Activity-related Absences

For varsity and club athletics, student organizations and other activities that may require absences, please let me know early in the semester, and at least two weeks in advance, of travel or activities that will require you to be absent for class meetings, so that we may arrange makeups or alternate deadlines. *Participation in the Design Expo (virtual or in-person/class) is mandatory.*