

GEOG 5850/6850: Drones and Geospatial Applications

Department of Geosciences, Auburn University

Dr. Stephanie Rogers

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Class time: **MW** 1:00 – 2:50pm

334-844-4069

Class location: Haley 2174*

Office location: Haley 2046F

3 Credit hours

Office hours: M 3:00 – 4:00pm or by appointment (zoom is also possible)

Teaching Assistant: Subhasis Ghosh subhasis@auburn.edu (office hours by appointment)

*This room requires swipe access which all students will be provided within the first couple weeks of the semester.

What is this course about?

This course will cover everything you need to know about the use of drones for geographic data collection. There will be theoretical components to get you up to speed on the **WHY's** of drones and practical components on the **HOW's** of drones. This course will be **hands-on and require a lot of class participation**. We will go out into “the field” and collect data; we will be challenged, and we will produce geographic information in a way that you may have never done before. The main goal of this course is to provide you with the skills, confidence, and wherewithal to (potentially) become a drone pilot and **increase your skills** for the workforce or to **enhance your research profile** to further your academic research career.

What will you learn?

1. ...the rules and regulations required to safely operate a drone in various environmental settings (with the potential of obtaining an [FAA Part 107 Remote Pilot's License](#))
2. ...how to collect and process aerial imagery from a variety of sensors (RGB, multispectral, thermal) using Structure from Motion (SfM) and a photogrammetric software (Pix4D Mapper)
3. ...to formulate a research question and hypothesis to guide drone data collection, processing, and interpretation
4. ...to use Geographic Information Systems (GIS) to calculate indices, perform spatial analyses, and produce maps
5. ...how to synthesize, interpret, and communicate results obtained from drone imagery

Course topics

Introduction to Remote Sensing, GIS

Introduction to Drones, Rules, and Regulations

Aerial imagery, Orthomosaics, Structure from Motion (SfM)

Integration of Ground Control, GPS, and RTK GPS

Terrain Mapping and Digital Surface Models

Multispectral Imagery and Indices

Readings and textbooks

Readings are required and necessary to be able to excel in this course. Please visit the [dynamic course schedule](#) (more info below) to view the required readings before each time we meet. Some key readings and reference texts are listed below. All readings will be available on Canvas.

Key Readings:

1. Mathews, A. J., Singh, K. K., Cummings, A. R., Rogers, S. R. (2023). Fundamental practices for drone remote sensing research across disciplines. *Drone Systems and Applications*. <https://doi.org/10.1139/dsa-2023-0021>

Reference textbooks:

2. Frazier, A. E., & Singh, K. K. (2021). Fundamentals of capturing and processing drone imagery and data. (eBook available through the RBD library website: <http://spot.lib.auburn.edu/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=cat07161a&AN=aul.5952218&site=eds-live&scope=site>)
3. Carrivick, J. L., Smith, M. W., Quincey, D. J. (2016). Structure from Motion in the Geosciences. (eBook available through the RBD library website: <https://onlinelibrary-wiley-com.spot.lib.auburn.edu/doi/book/10.1002/9781118895818>)

Dynamic course schedule

Please use this link: <https://aub.ie/SP24drones> to follow along with the detailed course activities including topics, deliverable dates, links to readings, and basically everything! **Bookmark this link in your browser for easy access to info.**

How will you be assessed?

Description	5850 (UG)	6850 (Grad)
Lab exercises (4)	600	400
Projects		
Proposal	100	100
Presentation	-	150
Report	200	250
Class participation	100	100
Total	1000	1000

A 1000-point grading scale will be used for the final grades: 900-1000 A, 800-899 B, 700-799 C, 600-699 D, <600 F.

Software

Geospatial tools

- If you do not already have an Auburn University designated Esri username and password, you may request one [here](#), to be able to access Esri's suite of products (ArcGIS Pro, Training Modules, etc.). If you need to update your permissions with your username and password, submit a helpdesk ticket to Auburn [IT Service Desk here](#).
- You will be provided access to [Pix4Dmapper](#) on the computer labs in Haley 2174.

Class discussion platform – Microsoft Teams

We will be using **Teams** for class announcements and discussions (visit [Getting started guide](#) if you are unfamiliar with how it works). Teams can be downloaded [here](#) (for desktop and mobile devices). **We will use this platform for all forms of class communication (questions, troubleshooting, group discussions etc.). Please ensure your notifications are turned on, either from the desktop version or the app. Please do not email with questions, send a message on Teams.** You will get a much quicker response this way. Additionally, be respectful of my work/life balance and understand that I will not usually respond outside of regular work hours (i.e., 8-5 Monday to Friday).

Class Policies

Attendance: *Class attendance is mandatory due to the nature of this course. Class attendance will be carefully monitored and recorded.* All announcements concerning assignments, possible changes in examination dates, etc., will be given in class. **If an absence is unavoidable, it is the student's responsibility to contact classmates to obtain notes and class announcements.**

Make-up Policy: No make-up quizzes or assignments are given without a University-approved excuse. If for a legitimate reason you cannot take a quiz on a given date, it is your responsibility to contact me as soon as possible, preferably before you miss the exam. If you miss a quiz and you have a University-approved excuse (see Student Policy eHandbook, www.auburn.edu/studentpolicies) with appropriate written documentation (e.g., from a doctor, lawyer, or coach, on official stationary) that is turned in within one week of the missed quiz, then you will be allowed to take a make-up quiz. All make-up quizzes will be given within 2 weeks of the original in one of your instructor's offices. A zero will be assigned two weeks from the date and time of the quiz that you missed. **No make ups are given for missed in-class activities; no quizzes will be given early without a university-approved excuse.**

Behavior: Civility and integrity are expected at all times. The use of cell phones, tablets, or laptops for purposes other than class related work is not allowed during class or lab. Flagrant violation of this policy will result in you being dismissed from class.

Face Coverings: Face coverings in this class are currently optional. This may change throughout the semester depending on the status of COVID-19 at Auburn University. In the case that face coverings are again needed, students in this class will be required to wear face coverings that appropriately cover the nose and mouth to limit the spread of infectious disease. Failure to comply with the requirement represents a potential Code of Student Conduct violation and may be reported as a non-academic violation. Please consult the [Policy on Classroom Behavior](#) for additional details.

Emergency Contingency statement: If normal class and/or lab activities are disrupted due to illness, emergency, or crisis situation (such as another COVID-19 outbreak), the syllabus and other course plans and assignments may be modified to allow completion of the course. If this occurs, an addendum to your syllabus and/or course assignments will replace the original materials.

Generative Artificial Intelligence tools

Moderate Use Guidelines: Encourage AI use in specific assignments, but not all. Students must disclose any AI assistance.

AI Policy: Permitted when Assigned in this Course with Attribution

In this course, students are permitted to use Generative AI Tools such as ChatGPT for specific assignments, as designated by the instructor. To maintain academic integrity, students must disclose any use of AI-generated material. As always, students must properly use attributions, including in-text citations, quotations, and references. Students should exercise caution and avoid sharing any sensitive or private information when using these tools. Examples of such information include personally identifiable information (PII), protected health information (PHI), financial data, intellectual property (IP), and any other data that might be legally protected.

A student should include the following statement in assignments to indicate use of a Generative AI Tool: "The author(s) would like to acknowledge the use of [Generative AI

Tool Name], a language model developed by [Generative AI Tool Provider], in the preparation of this assignment. The [Generative AI Tool Name] was used in the following way(s) in this assignment [e.g., brainstorming, grammatical correction, citation, which portion of the assignment]." Failure to do so will result in a violations of the Academic Honesty Policy (see below).

Academic Honesty Policy: Academic honesty is taken very seriously in this course. It is your responsibility to know what plagiarism is. All portions of the Auburn University student academic honesty code (Title XII) found in the [Student Policy eHandbookLinks to an external site.](#) will apply to this class. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

In this class, violations of academic honesty include, but are not limited to

1. using generative AI without proper attribution as stated above
2. copying another person's work on any graded assignment or test,
3. allowing someone to copy your work,
4. collaborating on a graded assignment without the instructor's approval,
5. using unauthorized "cheat sheets" or technical devices such as calculators or cell phones for graded tests or assignments. Having an electronic device accessible during class on an exam day will be considered cheating, and you will earn a zero on the exam,
6. using quotes, summarizing ideas or borrowing facts, statistics, graphs, pictorial representations, or phrases without acknowledging the source, and
7. other infractions listed under the Auburn University Student Academic Honesty Code
at <https://sites.auburn.edu/admin/universitypolicies/Policies/AcademicHonestyCode.pdf>[Links to an external site.](#)

Disability Accommodations: Students who need accommodations are asked to electronically submit their approved accommodations through AU Access and to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by e-mail. If you have not established accommodations through the Office of Accessibility, but need accommodations, make an appointment with the Office of Accessibility, 1228 Haley Center, 844-2096 (V/TT).

Basic Needs: Any student who faces challenges securing their food or housing and believes this may affect their performance in the course or others is urged to contact Auburn's Basic Needs Center for support at <https://aub.ie/basicneeds>[Links to an external site.](#). Furthermore, please notify the professor if you are comfortable in doing so as this will allow the faculty member to connect you with any other known resources. I would be more than happy to help you.

Mental Health: If you are experiencing stress that feels unmanageable (personal or academic) during the semester, Auburn University's Student Counseling & Psychological Services (SCPS) offers a variety of services to support you. The mission of SCPS is to provide comprehensive preventative and clinical mental health services to enhance the psychological well-being of individual students, as well as the broader campus culture. As an instructor, I am available to speak with you regarding stresses related to your work in this course, and I can assist in connecting you with the SCPS network of care. You can schedule an appointment yourself with the SCPS by calling [\(334\)844-5123](tel:3348445123) or by stopping by their offices on the bottom floor of Haley Center or the second floor of the [Auburn University Medical Clinic](#). [Links to an external site.](#)

If you or someone you know needs to speak with a professional counselor immediately, the SCPS offers counseling during both summer term as well as the traditional academic year. Students may come directly to the SCPS and be seen by the counselor on call, or you may call [334.844.5123](tel:3348445123) to speak with someone. Additional information can be found at <http://wp.auburn.edu/scs> [Links to an external site.](#)

Justification for Graduate Credit: This graduate section of this course goes above and beyond typical undergraduate courses by challenging the student to think critically about scientific literature, critique themselves and their peers in an effective manner, explore advanced geospatial concepts, and present their researching findings to their peers and the broader public.