

## CSM 8690 – Applied Applications of Unmanned Aircraft Systems Summer 2024 – (ONLINE)

**Course Instructor:** Joe Burgett

Telephone: (864) 744-2026

Email: [jmburg@clermson.edu](mailto:jmburg@clermson.edu)

Address:

Clemson University

109 Lee Hall 3

Clemson, South Carolina 29634

**Office Hours:** Monday/Wednesday 9:00am – 11:00am

Tuesday 12:00pm – 2:30am

Other times by appointment

**Class Meeting Times:** Asynchronous

Students are expected to wait 15 minutes in the case the faculty member has been delayed unless notified otherwise.

**Class Meeting Location:** Online

**Prerequisite:** Instructor consent

**Course Description:** This course will explore how data captured from small unmanned aircraft systems (sUAS), commonly referred to as drones, can be used to create high-quality 3D models and thermal inspections. Students enrolled in the course will prepare to take the FAA Part 107 exam and have the option to earn their remote pilots' certificate. Drone flight skills will primarily be taught through computer simulation software. Students will complete the Airborne Public Safety Association (APSA) BPERP examination and have the option of earning their flight proficiency certification. At the end of the course, students will have the skills and knowledge to operate a drone in the national airspace to support their research or future profession. This course is interdisciplinary and well-suited for students interested in construction, architecture, civil engineering, communication, real estate, surveying, photography, law enforcement, wildlife, and agriculture. A background in construction is not required for this course.

**Course Objectives:** Upon completion of this course the student should be able to:

1. Be prepared to take the FAA Part 107 Remote Pilot's Certificate.
2. Demonstrate a competency in flying an unmanned aircraft system.
3. Take the APSA BPERP flight proficiency exam.
4. Apply photogrammetric principles and image capturing best practices.
5. Create photogrammetric models from real world sources.
6. Learn the fundamentals of UAS Thermography
7. Tune 2D thermograms
8. Create 3D thermographic models

**Topical Outline for Lecture Classes** (with approximate times):

- 4 weeks: Prepare for the Part 107 Exam
- 1 weeks: Regulatory compliance tools
- 2 weeks: Learning photogrammetric best practices
- 2 weeks: Practical flight skills
- 2 weeks: UAS thermography

**Course Text:**

- There is no textbook required.
- Must purchase a Flysky FS-i6S controller for simulator software. **Sticks must be self-centering.**  
[Get FPV vender option](#)
- Strongly encouraged to purchase hard copies of these booklets. They are available on Amazon and number of other vendors
  - [FAA-G-8082-22 FAA Study Guide](#)
  - [FAA-CT-8080-2H FAA Test Supplement Booklet](#)

**Mode of Presentation, Course Requirements, and Method of Evaluation:** This is an asynchronous online course. The course material is divided into weekly modules where the student can complete the work within the module at their own pace. The instructor will host an optional zoom call at the beginning of the week. The purpose of this call is to provide an overview of the material and answer any questions. The recording of the call will be provided to the class.

**Academic Integrity:**

As members of the Clemson University community, we have inherited Thomas Green Clemson’s vision of this institution as a “high seminary of learning.” Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

**Department Student Expectations**

The last day to drop a class or withdraw from the University without a W is May 21st, 2024. The last day to drop a class or withdraw from the University without final grades is July 9th, 2024. (Confirm dates with University)

**Evaluation:** The final grade for the course will be based on the following percentages:

FAA rules and regulation exam	25%
APSA BPERP Exam (on simulator)	10%
Level 1 Thermography Exam	25%
Course Assignments	40%

**Grade Scale:**

- 93-100 = A
- 90-92.99 = A-
- 87-89.99 = B+
- 84-86.99 = B
- 80-83.99 = B-
- 77-79.99 = C+
- 74-76.99 = C

70-73.99 – C-  
69.99 and below = F

**Exams:** Taking the FAA Part 107 exam is required. Your score on the exam will be used at the score for the “Part 107 Exam” assessment in the grade book.

**Assignments:** Assigned homework is due at the beginning of the next class period. **Late homework will not be accepted and students will receive a zero on the assignment.** All work turned in for this course is expected to be of professional quality in content and presentation.

**Inclement Weather:** Any exam, quiz or assignment that was scheduled to be completed or submitted at the time of a class cancellation due to inclement weather, power outages, etc. will be given at the next class meeting unless contacted by the instructor.

**Computer:** Student must have lab top computer consistent with CSM department standards. Minimum standards are provided below. Most of the course can be completed using a Mac or PC. However, there is a small section in the thermography portion of the class that requires a PC to complete. Partitioning the hard drive is an option.

- Operating System: Windows 10 or higher / Mac OS High Sierra 10.13 or higher
- CPU: Intel Core i7 @ 3.6 GHz or equivalent
- Memory: 8 GB RAM
- Hard Drive: 8 GB available in hard disk
- Graphics Hardware: Direct X 10 or higher compatible graphics card (GTX660 equivalent or higher)
- Internet Connection: DSL or higher

**University Expected Student Behavior:**

**Class Attendance** - Class attendance is mandatory. Unexcused absences may affect the student’s final grade at the discretion of each department faculty member as shown in the respective course syllabus. A student with two or more unexcused absences for classes that meet once a week; four or more unexcused absences for classes that meet twice a week, or six or more unexcused absences for classes that meet three times a week will, as a matter of departmental policy, be dropped from the respective course and receive an F unless the student voluntarily drops the course within the approved university time frame. Additionally, students should understand that, unless prior arrangements have been made and approved, leaving class prior to the time it has been dismissed by the faculty member is unprofessional and unacceptable, and may result in an absence being recorded.

**Punctuality** - Students are expected to be in class at the time it is scheduled to begin. Repeated tardiness is unacceptable. Two instances of tardiness will result in one unexcused absence. Excessive incidents of tardiness may result in a reduction of a student’s grade.

Attire - Students are expected to dress in a professional manner as if they were going to a job site as a construction industry professional. Ball caps should be taken off or turned around during exams and quizzes.

Cell Phones and Laptop Computers - Cell phones are to be turned off or to vibrate during class. Not adhering to this courtesy may result in confiscation of the phone during class. Laptop computers are allowed in class for the purpose of taking notes and other faculty-designed purposes. If the computers are used for non-approved purposes during class, students will be asked to leave the class for that day.

Food and Drinks - Food and drink may be consumed in classrooms at the discretion of the respective faculty member. If allowed and you bring food and drink you are expected to clean up after yourself placing trash and recyclables in proper containers. Because of budget cuts, custodial staffs have been cut back. They are not expected to clean up food and drink containers left in classroom spaces. Note: only non-alcoholic beverages are to be consumed unless approved in advance for receptions at special events.

Academic Continuity - Clemson has developed an Academic Continuity Plan for academic operations. Should university administration officially determine that the physical classroom facility is not available to conduct classes in, class will be conducted in a virtual (online) format. The University issues official disruption notifications through email /www /text notification/Social Media.

Academic Honesty - A student's work is expected to be his/her own. Academic dishonesty of any kind is unethical and unacceptable, and will result in dismissal from class and course failure or lowering of course grade. Consequences are at the discretion of the respective faculty member, and in accordance with policy and procedure as contained in the university Student Handbook.

Ethics- The construction industry demands the highest standards of ethical conduct. There are three types of ethics: Business or Legal, Professional or Balanced, and Situational (Blanchard, K. and Peale, N.V.). Business or Legal ethics is adhering to all legal, academic and other pertinent regulations. Professional or Balanced ethics is carrying out all activities in such a manner as to be fair to everyone concerned. Finally, Situational ethics pertains to specific activities or events that may initially appear to be a "gray area" until you ask yourself: "How will I feel about myself if my actions are published in the newspaper or if I have to justify my actions to my family, friends and colleagues? Students in the Nieri Family Construction Science and Management Department are expected to uphold the highest standards of Legal, Professional and Situational ethics. Failure to do so will result in the student having to meet with the department Chair for disciplinary actions including possible removal from the respective courses and/or program. Reference: The Power of Ethical Management, K. Blanchard & N.V., Peale, 1982, Fawcett, New York.

Accessibility - Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to a class should let the professor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing [studentaccess@lists.clemson.edu](mailto:studentaccess@lists.clemson.edu) , or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged – drop-ins will be seen if possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors as early in the semester as

possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: <http://www.clemson.edu/campus-life/campus-services/sds/>.

Title IX (Sexual Harassment) - Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/>. Ms. Alesia Smith is the Clemson University Title IX Coordinator and the Executive Director of Equity Compliance. Her office is located at 110 Holtzendorff Hall, 864.656.3181 (voice) or 864.656.0899 (TDD).

#### Academic Integrity

"As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."

Consequences are as follows: first offense results in receiving a zero for the academic work. The second offense will result in receiving an F in the course.

#### Accessibility Statement

"Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the professor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing [studentaccess@lists.clemson.edu](mailto:studentaccess@lists.clemson.edu), or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged – drop-ins will be seen if at all possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: <http://www.clemson.edu/campuslife/campus-services/sds/>.

#### Disability Access Statement

"It is university policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students with disabilities requesting accommodations should make an appointment with Disability Services (656-6848), to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Disability Services when they meet with instructors. Accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester."

## Emergency Procedures

“Emergency procedures have been posted in all buildings and on all elevators. Students should be reminded to review these procedures for their own safety.”

## Emergency Guidelines from Clemson University Police Department

All students and employees should be familiar with the following guidelines. For additional information about safety see <http://www.clemson.edu/cusafety/preparedness/>.

### Evacuation:

- When evacuating buildings, do not use elevators as they may lose power, stranding riders.
- Familiarize yourself with the locations of stairwells and exits.
- Individuals needing assistance evacuating should move to a stairwell away from the hazard, dial 911, and provide the Dispatcher with their exact location and what they need regarding evacuation.
- When evacuating follow the instructions provided by Public Safety personnel to reach a safe place.
- To seek “Tornado Safer Places,” get to the lowest level of the building time allows, stay away from areas with windows and glass, and put as many walls as you can between yourself and the outside. In public buildings, bathrooms typically have an additional wall.

### Active Shooter:

- Always call 911 as soon as you possibly can.
- Run away from the area, if it is safe to do so, time allows and the gunman is not nearby.
- Hide if the gunman is too close to your location. Find a safer place, lock and barricade doors, turn lights out and cell phones off or to vibrate.
- Fight. As a last resort, resolve to fight the intruder with everything you have at your disposal.

A short video prepared and presented by the Department of Homeland Security can be found at the following link: [dhs.gov/video/options-consideration-active-shooter-preparedness-video](https://www.dhs.gov/video/options-consideration-active-shooter-preparedness-video).

### Copyright Statement

“Materials in some of the courses are copyrighted. They are intended for use only by students registered and enrolled in a particular course and only for instructional activities associated with and for the duration of the course. They may not be retained in another medium or disseminated further. They are provided in compliance with the provisions of the Teach Act. Students should be reminded to refer to the Use of Copyrighted Materials and “Fair Use Guidelines” policy on the Clemson University website for additional information: <http://www.clemson.edu/library/>”