

COURSE SYLLABUS
SUR6934 Geospatial Applications of UASs

W 7th Period, F 6-7th Period
Fall Semester
(3 Credits)

Prerequisites

SUR6934C *Foundations of UAS Mapping* (or Permission of Instructor)

Instructors

Dr. Grenville Barnes gbarnes@ufl.edu (352) 392 4998 Reed Lab 406B

Dr. Ben Wilkinson benew@ufl.edu (352) 392-3465 Reed Lab 406A

Office Hours – Wednesday 2pm-4pm in Reed Lab 406A (or by arrangement)

Course Overview and Objectives

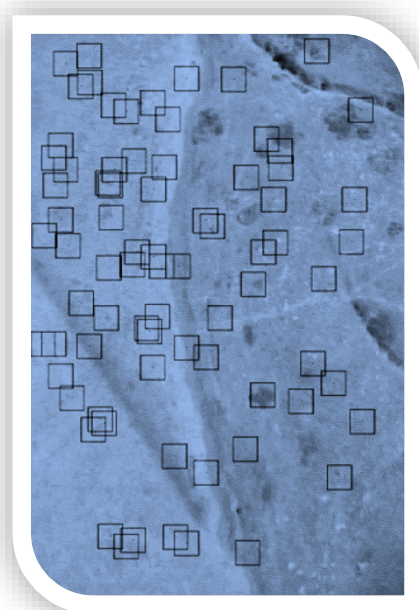
Covers issues and applications associated with small UASs.

By the end of this course, the student will be able to:

- describe common/typical UAS applications (e.g. agriculture, forestry, property rights)
- describe the technical considerations involved in implementing UAS applications
- cite the common business and legal aspects of operating UASs
- lead and participate in current debates on UAS issues and applications

Method of Instruction

This class is designed as an active learning experience. In-class and online discussions are critical, and students are expected to engage in these activities. Students prepare for each weekly lecture by completing related reading assignments. In addition, each week a team of students is tasked to lead a discussion in preparation for the lecture to increase the class' foundational knowledge in the area to be presented and facilitate active discourse during the lecture. A



different team will guide the preparatory discussion each week. Students are expected to participate via the message boards on the course website, which is the primary method of engagement for students taking the course asynchronously. Student will also, with guidance from the instructors, develop a term project (see below) to be presented towards the end of the semester.

Meeting Times and Places

The class meets twice a week: a one period session on Wednesday (11:45am-12:35pm) for a preparatory discussion led by a team of students; and a two period session on Friday (11:45am-1:40pm) for the lecture. Asynchronous students participate in the discussion by posting comments to the course website prior to the class meeting time.

Readings

The following readings are required:

DARC (2013). Law and Policy Guidebook. Drones and Aerial Robotics Conference. http://droneconference.org/darc2013_guidebook.pdf

FAA (2014) Interpretive Rule summarizing FAA interpretation of the Special Rule for Model Aircraft.
<https://www.federalregister.gov/articles/2014/06/25/2014-14948/interpretation-of-the-special-rule-for-model-aircraft>

FAA Modernization and Reform Act of 2012 – PL 112-95 (Secs 332-336)
http://www.faa.gov/regulations_policies/reauthorization/media/PLAW-112publ95%5B1%5D.pdf

Zhang, C. and J. Kovacs (2012). “The Application of Small Unmanned Aerial Systems for Precision Agriculture: A Review.” *Precis. Agric.* 13: 693–712.

Volkman, W. and G. Barnes (2014). “Virtual Surveying: Mapping and Modeling Cadastral Boundaries Using Unmanned Aerial Systems (UAS).” *Proceedings of XXV International Federation of Geomatics (FIG) Congress, Kuala Lumpur, Malaysia.*

Getzin, S., K. Wiegand, I. Schoening (2012). “Assessing Biodiversity in Forests Using very High-Resolution Images and Unmanned Aerial Vehicles.” *Methods Ecol. Evol.* 3: 397–404

Hardin, P.J.; Jensen, R.R. Introduction—Small-Scale Unmanned Aerial Systems for Environmental Remote Sensing. *GISci. Remote Sens.* 2011, 48, 1–3.

Hardin, P. and R. Jensen (2011). "Small-Scale Unmanned Aerial Vehicles in Environmental Remote Sensing: Challenges and Opportunities. *GISci. Remote Sens.* 48: 99–111

Watts, A., J. Perry, S. Smith, M. Burgess, B. Wilkinson, Z. Szantoi, P. Ifju and H. Percival (2010). "Small Unmanned Aircraft Systems for Low-Altitude Aerial Surveys." *J. Wildl. Manag.* 74: 1614–1619.

Communication

The course is managed through the Canvas system and all communication with instructors should be done through the facilities in that system.

Course Evaluation

Grading is based predominantly on participation, but will also include a term project, and a final quiz. The final course grade is broken down as follows:

1) Participation.	30%
2) Preparatory presentation	20%
3) Term Project (including presentation)	40%
4) Final Exam	10%

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

1. Participation (30%)

Students are evaluated based on thoughtfully contributing to the class discussions and message board. Attendance is mandatory, and unexcused absences will be penalized. For asynchronous students, the discussion board contributions will be more heavily weighted based on their ability to attend live lectures.

2. Preparatory Presentation (20%)

Students are expected to develop a professional-grade presentation encompassing key components of the speaker's area of expertise. The presentation will cover the week's assigned reading material in addition to material from other sources which the student team will identify through independent research. The team is also expected to work with the instructors to ensure that the presentation is professional. Asynchronous students will work with the instructor to develop recorded modules to be presented.

3. Term Project (40%)

The term project will focus on an instructor-approved UAS-related subject. Throughout the semester, the student will provide milestone reports on their project, each of which will be graded and returned with accompanying guidance from the instructors. At the end of the semester, students will prepare a journal-style paper on the topic, based on the term project, and give a brief presentation of their project to the class (worth 5% of the 40%).

4. Final Exam (10%)

The final exam will be composed of questions related to the guest lectures and the assigned reading material.

Grade Scale

A	95 -100%
A-	90 - 94.99%
B+	87 - 89.99%
B	83 - 86.99%
B-	80 - 82.99%
C+	77 - 79.99%
C	73 - 76.99%
C-	70 - 72.99%
D+	67 - 69.99%
D	63 - 66.99%
D-	60 - 62.99%
E	0 - 59.99%

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

UF Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated.

Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Wellness Coaching
- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*

Schedule

<u>Lec</u>	<u>Subject</u>
1	Rules and regulations

- 2 Business aspects
- 3 Agriculture applications
- 4 Cadastral applications
- 5 Forestry applications
- 6 Natural resource applications
- 7 Wildlife applications
- 8 Navigation sensors
- 9 Cameras and other geospatial sensors
- 10 User groups and open-source
- 11 Big data and cloud computing
- 12 UAV Engineering and design

Monday	Tuesday	Wednesday	Thursday	Friday
8/24	8/25	8/26 Introduction	8/27	8/28
8/31	9/1	9/2 Prep Lecture 1	9/3	9/4 Lecture 1
9/7 Labor Day	9/8	9/9 Prep Lecture 2	9/10	9/11 Lecture 2
9/14	9/15	9/16 Prep Lecture 3	9/17	9/18 Lecture 3 Term Project Proposal Due
9/21	9/22	9/23 Prep Lecture 4	9/24	9/25 Lecture 4
9/28	9/29	9/30 Prep Lecture 5	10/1	10/2 Lecture 5 Updated Term Project Proposal Due
10/5	10/6	10/7 Prep Lecture 6	10/8	10/9 Lecture 6
10/12	10/13	10/14	10/15	10/16 Homecoming
10/19	10/20	10/21 Prep Lecture 7	10/22	10/23 Lecture 7
10/26	10/27	10/28	10/29	10/30

		Prep Lecture 8		Lecture 8
11/2	11/3	11/4 Prep Lecture 9	11/5	11/6 Lecture 9 Term Project Progress Report Due
11/9	11/10	11/11 Prep Lecture 10	11/12	11/13 Lecture 10
11/16	11/17	11/18 Prep Lecture 11	11/19	11/20 Lecture 11
11/23	11/24	11/25	11/26 Thanksgiving	11/27 Thanksgiving
11/30	12/1	12/2 Prep Lecture 12	12/3	12/4 Lecture 12
12/7	12/8	12/9 Prep Lecture 13	12/10	12/11 Lecture 13 Final Term Project Submission
12/14	12/15	12/16 Term Project Presentations	12/17	12/18 Term Project Presentations