

COURSE SYLLABUS
SUR 4940C/6934 PRACTICUM IN UAS MAPPING
Summer A (2 weeks following exam week)



Prerequisites

SUR6934 *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
Dr. Eben Broadbent eben@ufl.edu	(650) 204-1051	Reed Lab 303

Office Hours – Immediately following daily activities (or as arranged)

Course Description and Learning Objectives

This three-credit course provides students hands-on experience with flight planning and effective deployment of small unmanned aerial systems (UASs), and the subsequent processing and analysis of the imagery acquired on these flights.

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

- plan flights using open source software
- plan and establish ground control and ground truth
- deploy a UAS in an automated mode
- process high resolution aerial data taken from a UAS
- produce deliverables such as orthophotos, digital elevation models (DEM), and 3D terrain models
- analyze the spatial quality of UAS products
- apply UAS data to specific ecological and industrial applications

Method of Instruction

The course will meet daily over a period of 10 days for a total of 70 hours. Learning will occur through a combination of lectures, field exercises, and supervised in-lab work. The course is only available in Gainesville (no distance option).

Meeting Times and Places

The class will meet at 8:30am in 402 Reed Lab.

Course Evaluation

Grading is based on participation, short on-line quizzes, and a final project presentation:

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|---------------------------------|-----|
| a) Attendance and participation | 10% |
| b) Deliverables | 50% |
| c) Final Poster | 40% |

Attendance and Participation

Students are expected to attend all lectures, lab tutorials and field sessions and actively participate in all these activities. Requirements for class attendance, assignments and other work are consistent with university policies that can be found at:

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

Intermediate Deliverables

As the course progresses, students are required to submit several intermediate products, such as: flight plans, ground control plan and coordinates, point cloud, orthophoto, and analysis

Final Poster

Each student is required to complete a POSTER which summarizes the methodology, technology, analysis and results achieved using both a vertical-take-off-and-landing (VTOL) and fixed-wing UAS carrying lidar, multi-spectral and RGB sensors. Students are required to evaluate their results and compare these with conventional approaches. Students should be prepared to give a short poster presentation.

Grade Scale

A	93 -100%	C	73 - 76.99%
A-	90 - 92.99%	C-	70 - 72.99%
B+	87 - 89.99%	D+	67 - 69.99%
B	83 - 86.99%	D	63 - 66.99%
B-	80 - 82.99%	D-	60 - 62.99%
C+	77 - 79.99%	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>

Class and Project Schedule

Time	Activity	Loc.	Hours
Day 1 (Mon)	<ul style="list-style-type: none"> • Introduction to Course and Logistics: <ul style="list-style-type: none"> ○ Terms of Reference ○ Site 1 description ○ Site 2 description ○ Resources ○ Work Plan for week • Ground Control Plan (Site 1) • Mission Planning (Site 1) • Ground truth Planning (Site 1) 	302/ 402 Reed	8
Day 2 (Tues)	<ul style="list-style-type: none"> • Safety briefing • Reconnaissance • Set GCPs and targets • UAS Flights • Survey in GCPs • Ground truth surveys • Download, share data (Reed Lab) 	Site 1	8
Day 3 (Wed)	<ul style="list-style-type: none"> • Process GCP data, UAS imagery, ground truth data (morning) • Ground Control Plan (Site 2) • Mission Planning (Site 2) • Ground truth Planning (Site 2) 	402 Reed	8
Day 4 (Thurs)	<ul style="list-style-type: none"> • Reconnaissance • Relocation of GCPs, set targets • UAS Flights • Survey in GCPs • Ground truth survey • Download, share data (Reed Lab) 	Site 2	8
Day 5 (Fri)	<ul style="list-style-type: none"> • Complete flying • Complete field work • Download, share data (Reed Lab) 	Site 2	8
Day 6 (Sat)	<ul style="list-style-type: none"> • Processing and analysis 	402 Reed	6
Day 7 (Sun)	<ul style="list-style-type: none"> • Processing and analysis 	402 Reed	...
Day 8 (Mon)	<ul style="list-style-type: none"> • Processing and analysis • Organize results • Prepare discussion • Outline poster 	402 Reed	8
Day 9 (Tues)	<ul style="list-style-type: none"> • Prepare poster • Print poster 	402 Reed	8
Day 10 (Wed)	<ul style="list-style-type: none"> • Finalize poster • Final Poster Presentations 	Reed Lab	8
		Tot.	70 Hrs

Online Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

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>.

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.

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/

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/*

Other Requirements

Cellular phones must be silenced during class. They may be used in field sessions for field work communication pertaining to this course work only.