

**Department of Civil Environmental and Geomatics Engineering
Florida Atlantic University
Course Syllabus**

1. Course title/number, number of credit hours		
Foundations of UAS Mapping (SUR 4502C)		3 credit hours
2. Course prerequisites, corequisites, and where the course fits in the program of study		
Prerequisite: none		
3. Course logistics		
Term: Spring 2021 This is an on-line course with 2 lab demonstrations Class location: CM130 Class time: Wednesday, 7:10 –10:00 PM Office Hour: Wednesday and Thursday 9am-12pm in Room 223		
4. Instructor contact information		
<i>Instructor's name</i>	Dr. Hongbo Su.	
<i>Office address</i>	Building: 36, Room: 223	
<i>Office Hours</i>	Boca Raton, FL	
<i>Contact telephone number</i>	Phone: (561) 297 3936	
<i>Email address</i>	E-mail: suh@fau.edu	
5. TA contact information		
<i>TA's name</i>		
<i>Office address</i>		
<i>Office Hours</i>		
<i>Contact telephone number</i>		
<i>Email address</i>		
6. Course description		
COVERS THE FUNDAMENTAL COMPONENTS OF SMALL UNMANNED AERIAL SYSTEMS (sUAS) AND HOW THEY ARE USED TO PRODUCE HIGH RESOLUTION, SPATIALLY ACCURATE, PLANIMETRIC MAPS AND 3-D MODELS OF THE TERRAIN.		
7. Course objectives/student learning outcomes/program outcomes		
<i>Course objectives</i>	<ol style="list-style-type: none"> 1. Be able to identify the essential hardware components of sUAS 2. Understand rules and regulations governing operating a UAS in the United States of America 3. Understand fundamental concepts surrounding operating a UAS 4. Be familiar with standard sUAS mapping workflow and be able to write effective project reports 	
<i>Student learning outcomes & relationship to ABET 1-7 objectives</i>	<ol style="list-style-type: none"> 1. The ability to understanding theoretical background of UAS Mapping Systems (1) 2. The ability to operate the UAS Mapping Systems and do basic image processing (1, 3) 3. The ability to apply a UAS Mapping System in a well-defined project (1,3,4, 5,6) 	
<i>Relationship to program outcomes</i>	Outcome 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High

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	Outcome 2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	High
	Outcome 3: an ability to communicate effectively with a range of audiences.	Medium
	Outcome 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	Medium
	Outcome 5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	Medium
	Outcome 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Medium
	Outcome 7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	High

8. Course evaluation method

<p>Course attendance: 5%</p> <p>Assignments: 35%</p> <p>Midterm: 20%</p> <p>Midterm: 40%</p>	<p><i>Note:</i> The minimum grade required to pass the course is C.</p> <ul style="list-style-type: none"> • Attendance for Lab session is required. • No make-up exams or quizzes will be conducted. • Exam dates will be re-confirmed if required.
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9. Course grading scale

There is not any fix criteria for the grading scale. The overall performance as related to course objectives and outcomes is evaluated and considered during grading.

10. Policy on makeup tests, late work, and incompletes

Makeup tests are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student of participating in the exam. Makeup exam should be administered and proctored by department personnel unless there are other pre-approved arrangements. [There will be no make-up quizzes.](#)

Late work is not unacceptable.

Incomplete grades are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation incomplete grades will not be given.

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11. Special course requirements
Computer Lab hours are required.
12. Classroom etiquette policy
University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.
13. Attendance Policy Statement
Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University -approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.
14. Disability policy statement
In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/ .
15. Honor code policy
Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf
16. Counseling and Psychological Services (CAPS) Center
Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/
17. Required or Recommended texts/reading

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1 OpenDroneMap: The Missing Guide
 Author: Piero Toffanin
 Publisher: Independently published (July 28, 2019)
 Language: English
 ISBN-10: 1086027566
 ISBN-13: 978-1086027563

2 Introduction to UAV Systems 4th Edition
 by Paul Fahlstrom (Author), Thomas Gleason (Author)
 Publisher: Wiley; 4 edition (September 17, 2012)
 Language: English
 ISBN-10: 1119978661
 ISBN-13: 978-1119978664

3 Handouts/lecture notes provided by instructor.

18. Supplementary/recommended readings

Remote Pilot Test Prep 2019: Study & Prepare
 Author: ASA Test Prep Board
 Publisher: Aviation Supplies and Academics, Inc.; 2019 edition (August 21, 2018)
 Language: English
 ISBN-10: 1619546663
 ISBN-13: 978-1619546660

Journal papers distributed in the class

19. Course topical outline, including dates for exams/quizzes, papers, completion of reading

Date	Topic
Week 1	Introduction; history and evolution of UAS
Week 2	Regulations and safety / FAA Part 107 intro Meteorology for flight dynamics
Week 3	Federal Aviation Regulations, Air Traffic Control and airspace operations
Week 4	Unmanned Aerial System (UAS) components and sensors, Applications of UAS
Week 5	UAS photogrammetry
Week 6	Safety of UAS Operations (guest lecture by Traci Johnson with an indoor UAV flight Demo on Feb. 19, 2020)
Week 7	Flight Planning for UAS, Establish ground control and ground truth
Week 8	Commercial software (PhotoScan) for UAS
Week 9	Mid-term exam
Week 10	Spatial Data Sharing using Google Earth
Week 11	Flight setup practical (Lab Demonstration)
Week 12	Mini-project
Week 13	Societal issues, future of UAS
Week 14	Project Presentations
Week 15	Course review
Exams	Final Exam (Date is to be determined by the University official Exam Schedule)