



**FLORIDA
ATLANTIC
UNIVERSITY**

Department GEOSCIENCES

College SCIENCE

(To obtain a course number, contact erudolph@fau.edu)

UUPC Approval _____
 UFS Approval _____
 SCNS Submittal _____
 Confirmed _____
 Banner Posted _____
 Catalog _____

Prefix GIS Number 4122	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) Lab Code C	Type of Course Lecture/Lab	Course Title MOBILE GIS & DRONE TECHNOLOGY
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Credits (Review Provost Memorandum) 3	Grading (Select One Option) Regular <input checked="" type="radio"/> Pass/Fail <input type="radio"/> Sat/UnSat <input type="radio"/>	Course Description (Syllabus must be attached; Syllabus Checklist recommended; see Guidelines) This course will introduce students to essential methods of generating spatial data in the field using Mobile GIS and Unmanned Aerial Systems (UAS). The fundamentals of Global Navigation Satellite Systems (GNSS) will be covered, as will the operation of various UAS, FAA regulations that govern their use, and the production of photogrammetric derivatives for subsequent use in GIS.	
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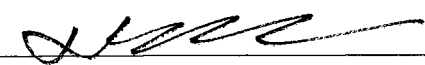
Prerequisites, with minimum grade* GIS 3015: "Introduction to Mapping & GIS", with minimum grade of "C"	Corequisites N/A	Registration Controls (Major, College, Level) N/A
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**Default minimum passing grade is D-. Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course*

WAC/Gordon Rule Course <input type="radio"/> Yes <input checked="" type="radio"/> No WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See WAC Guidelines .	Intellectual Foundations Program (General Education) Requirement (Select One Option) None General Education criteria must be indicated in the syllabus and approval attached to the proposal. See GE Guidelines .
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Minimum qualifications to teach course
Graduate Degree in Geosciences/GIS

Faculty Contact/Email/Phone James Gammack-Clark/jgammack@fau.edu/	List/Attach comments from departments affected by new course 7-0314
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Approved by	Date
Department Chair _____ 	03/17/2020
College Curriculum Chair <u>Jerry Haky (via email confirmation)</u>	3-27-20
College Dean <u>Evanne Rezler (via email confirmation)</u>	3-27-20
UUPC Chair <u>Jerry Haky (via email confirmation)</u>	3-30-20
Undergraduate Studies Dean <u>Edward Pratt (via email confirmation)</u>	3-31-20
UFS President _____	_____
Provost _____	_____

Email this form and syllabus to mjenning@fau.edu seven business days before the UUPC meeting.

GIS 4122C: MOBILE GIS & DRONE TECHNOLOGY

Geosciences Department
Spring 2020
3 Credit Hours

Instructor: James Gammack-Clark
Meeting Day/Time: Monday 11.00 am – 1.00pm
Meeting Location: S&E 457
Office Location: Science Building 412B
Office Hours: Tues/Thurs 10.30am – 1.30pm
Phone Number: (561) 297-0314
Email: jgammack@fau.edu

COURSE PREREQUISITES

GIS 3015: Introduction to Mapping & GIS.

COURSE DESCRIPTION

This course is intended to introduce students to ever more essential methods of generating primary spatial data in the field: Mobile GIS and Unmanned Aerial Systems (UAS). The essential, and often most expensive, component of GIS is the spatial data upon which it is built. The generation and subsequent maintenance of which typically requires field work at some point, the frequency of such activity being dictated by the dynamism of the phenomena in question. In this course, we will: learn the basics of Global Navigation Satellite Systems (GNSS); employ industry standard methods for capturing and inspecting GIS data in the field using GNSS technology (“Mobile GIS”); learn to fly UAS (aka “Drones”) of both rotary and fixed wing varieties; learn how to produce photogrammetric derivatives from drone imagery; become familiar with FAA regulations governing drone flights and prepare for subsequent certification. By necessity, this will require multiple “Field Days” culminating with a weekend trip in preparation for a term project.

COURSE OBJECTIVES

Upon successful completion of this course, students will be able to:

1. Define Global Navigation Satellite Systems (GNSS). (CO: 1)
2. Perform Mobile GIS tasks, such as capturing and editing data in the field, and subsequently integrating the data with a Geodatabase. (CO: 2)
3. Perform an aerial survey using a rotary UAS. (CO: 3)
4. Perform an aerial survey using a fixed wing UAS (CO: 4)
5. Generate photogrammetric derivatives from drone imagery. (CO: 5)

(CO = Course-Level Objectives.)

TIME COMMITMENT PER CREDIT HOUR

This course has three [3] credit hours. For traditionally delivered courses, not less than one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out-of-class student work for each credit hour. Equivalent time and effort is required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

REQUIRED/RECOMMENDED TEXTS & MATERIALS

In this course, you will need the following texts and/or materials:

- ASA Test Prep Board. (2019). *Remote Pilot Test Prep 2020*.
- USDOT - ASA Airman Knowledge Testing Supplement - *Sport Pilot, Recreational Pilot, and Private Pilot*

COURSE ASSESSMENTS, ASSIGNMENTS & GRADING POLICY

GRADING CRITERIA

Quizzes [40%]

Quizzes are designed to assess each student's comprehension of the material presented therein (approximately 5% of your course grade per quiz). The quizzes will include multiple choice, true/false and/or short answer questions. Answers will be evaluated based on content in terms of accuracy of information and ability to analyze the issues. Quizzes will be taken online in Canvas and will be timed. There will be **no 'make-up' quizzes** unless arranged **prior to and with good reason**.

Lab Assignments [50%]

Each module will be accompanied with one or more lab assignments designed to practically apply the theoretical concepts discussed during the lecture portions of the class. Labs will be **deducted 5%** for each day that they are **late**, unless arranged **in advance and with good reason**.

Term Project [10%]

The Term Project is designed as a capstone to the class and is intended to demonstrate accumulated knowledge and skill gained by the student during the course of the semester. There will be **no 'make-up' project** unless arranged **prior to and with good reason**.

GRADE SCALE

Grade	Total (%)
A	100 – 93
A-	92 – 90
B+	89 – 88
B	87 – 82
B-	81 – 79
C+	78 – 76
C	75 – 65
C-	64 – 60
D	59 – 51
F	50 – 0

LATE ASSIGNMENTS POLICY

Late assignments are not accepted. The instructor can make exceptions for sudden family death; medical illness or surgery; personal/family emergency; or university-mandated/approved activities. In these cases, timely notification and documentation are required.

INCOMPLETE GRADE POLICY

The University policy states that a student who is passing a course, but has not completed all work due to exceptional circumstances, may, with consent of the instructor, temporarily receive a grade of incomplete (“I”). The assignment of the “I” grade is at the discretion of the instructor, but is allowed only if the student is passing the course.

COURSE POLICIES

CODE OF ACADEMIC INTEGRITY POLICY STATEMENT

Students at Florida Atlantic University should endeavor to maintain the highest ethical standards. Academic dishonesty is 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 an unfair advantage over any other. Academic dishonesty is also destructive to the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see http://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf.

PLAGIARISM

[Plagiarism](#) is unacceptable in the University community. Academic work must be an original work of your own thought, research, or self-expression. When students borrow ideas, wording, or organization from another source, they must acknowledge that fact in an appropriate manner. Plagiarism is the deliberate use and appropriation of another's work without identifying the source and trying to pass off such work as one's own. Any student who fails to give full credit for ideas or materials taken from another has plagiarized. This includes all discussion board posts, journal entries, wikis, and other written and oral presentation assignments. If in doubt, cite your source.

ATTENDANCE POLICY

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.

NETIQUETTE

Due to the casual communication common in the online environment, students are sometimes tempted to relax their grammar, spelling, and/or professionalism. Please remember that you are adult students and professionals—your communication should be appropriate. For more in-depth information, please see the [FAU statement on netiquette](#).

CLASSROOM ETIQUETTE/DISRUPTIVE BEHAVIOR POLICY STATEMENT

Disruptive behavior is defined in the FAU Student Code of Conduct as "... activities which interfere with the educational mission within classroom." Students who disrupt the educational experiences of other students and/or the instructor's course objectives in a face-to-face or online course are subject to disciplinary action. Such behavior impedes students' ability to learn or an instructor's ability to teach. Disruptive behavior may include, but is not limited to non-approved use of electronic devices (including cellular telephones); cursing or shouting at others in such a way as to be disruptive; or, other violations of an instructor's expectations for classroom conduct.

For more information, please see the [FAU Office of Student Conduct](#).

COMMUNICATION POLICY

EXPECTATIONS FOR STUDENTS

Announcements

You are responsible for reading all announcements posted by the instructor. Check the course announcements each time you log in.

Email/Video Conferencing

You are responsible for reading all of your course email and responding in a timely manner.

Course-Related Questions

Post course-related questions to the FAQ discussion board. This allows other participants with the same question to benefit from the responses. Also, make sure you review this forum prior to posting a question. Someone may have already asked and answered the question in previous posts.

INSTRUCTOR'S PLAN FOR CLASSROOM RESPONSE TIME & FEEDBACK

Email/Video Conferencing Policy

Except for weekends and holidays, the instructor will typically will respond to email within 48 hours. You should ask course-related questions in the discussion board. If you have questions of a personal nature, you should email the instructor. Students **SHOULD NOT** communicate via the Canvas messaging system, but instead using traditional emails to facilitate the maintenance of the email chain, less the context of the students' questions become completely lost upon the professor. Video conferences may be facilitated during office hours upon request.

Assignment Feedback Policy

Feedback will be provided on submitted assignments within one week of the submission date. Some assignments may require a longer review period, which the instructor will communicate to you.

Course-Related Questions Policy

Except weekends and holidays, the instructor will generally answer questions within 48 hours.

Electronic Communication Policy

In addition to the University's policy, please consider the following:

- Privacy, confidentiality, and security in all electronic communications.
- All electronic communication resources must be used for the course and in alignment with to the University mission.
- Prohibited use of false identity, false identity pseudonyms, or anonymous (sender's name or electronic identification is hidden).
- Access without consent.
- Disruption of services including introducing computer contaminants (viruses).
- Harassment of any kind.

Please see the Office of Information Technology's policies on [Cyber Security Awareness](#).

SUPPORT SERVICES & ONLINE RESOURCES

- [Center for eLearning and Student Success](#)
- [Counseling and Psychological Services](#)
- [FAU Libraries](#)
- [Freshmen Academic Advising Services](#)
- [Math Learning Center](#)
- [Office of Information Technology Helpdesk](#)
- [Office of International Programs and Study Abroad](#)
- [Office of Undergraduate Research and Inquiry](#)
- [Student Accessibility Services](#)
- [University Center for Excellence in Writing](#)

FACULTY RIGHTS & RESPONSIBILITIES

Florida Atlantic University respects the rights of instructors to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede their exercise.

To ensure these rights, faculty members have the prerogative to:

- Establish and implement academic standards.
- Establish and enforce reasonable behavior standards in each class.
- Recommend disciplinary action for students whose behavior may be judged as disruptive under the *Student Code of Conduct*.

SELECTED UNIVERSITY & COLLEGE POLICIES

ACCESSIBILITY POLICY STATEMENT

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations to properly execute coursework due to a disability, must register with Student Accessibility Services (SAS) located in the Boca Raton, Davie, and Jupiter campuses and follow all SAS procedures. For additional information, please consult [Student Accessibility Services](#).

CONTACT

- **Boca Raton:** (561) 297-3880
Fax: (561) 297-2184, TTY: 711
- **Davie:** (954) 236-1222
Fax: (954) 236-1123, TTY: 711
- **Jupiter:** (561) 799-8721
Fax: (561) 799-8721, TTY: 711

GRADE APPEAL PROCESS

You may request a review of the final course grade when you believe that one of the following conditions apply:

- There was a computational or recording error in the grading.
- The grading process used non-academic criteria.
- There was a gross violation of the instructor's own grading system.

[Chapter 4 of the University Regulations](#) contains information on the grade appeals process.

RELIGIOUS ACCOMMODATION POLICY STATEMENT

In accordance with rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs with regard to admissions, registration, class attendance, and the scheduling of examinations and work assignments. For further information, please see [Academic Policies and Regulations](#).

UNIVERSITY APPROVED ABSENCE POLICY STATEMENT

In accordance with rules of the Florida Atlantic University, students have the right to reasonable accommodations to participate in University approved activities, including athletic or scholastics teams, musical and theatrical performances and debate activities. It is your responsibility to notify the instructor at least one week prior to missing any course assignment.

DROPS/WITHDRAWALS

You are responsible for completing the process of dropping or withdrawing from a course. Please click on the following link for more information on dropping and/or withdrawing from a course. Please consult the [FAU Registrar Office](#) for more information.

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/>

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**The instructor reserves the right to adjust this syllabus as necessary,
PARTICULARLY AS FIELD DAYS ARE SUBJECT TO FAVORABLE WEATHER CONDITIONS!!!**

Week	Dates	SYLLABUS FOR GEO 4930 Spring 2020
1	1/13	Working with Fixed Wing Drones: Fundamentals of Flight, UX11 Overview
	Section	
2	1/20	NO CLASS!!! (MLK Day)
3	1/27	Working with Fixed Wing Drones: Preparing a Mission, Flight Execution; Part 107 Prep: FAA Regulations
	Section	Quiz 1, Lab 1 – Preparing for a fixed wing UAS survey.
4	2/3	FIELD DAY: Data Collection with UX11
	Section	
5	2/10	Processing Data: Delair After Flight/Trimble Business Center/UAS Master; Part 107 Prep: National Airspace System
	Section	Quiz 2, Lab 2 – Creating preliminary output with TBC Photogrammetry module.
6	2/17	Working with Rotary Drones: Battery Management, ZX5 Overview; Part 107 Prep: Weather
	Section	Quiz 3
7	2/24	Working with Rotary Drones: ZX5 Remote Control; Part 107 Prep: Loading and Performance
	Section	Quiz 4, Lab 3 – Refining LAS output with ArcGIS 3D Analyst
8	3/2	FIELD DAY: Practice Flying the DJI Phantom
	Section	
9	3/9	NO CLASS!!! (Spring Break)
10	3/16	Working with Rotary Drones: External Factors, Aerial Imaging; Part 107 Prep: Operations
	Section	Quiz 5, Lab 4 – Preparing for a rotary UAS survey.
11	3/23	FIELD DAY: Practice Flying the Trimble ZX5
	Section	
12	3/30	Introduction to Mobile GIS with Collector
	Section	Quiz 6, Lab 5 – Generating Geodatabase Behavior with Subtypes
13	4/6	Introduction to Mobile GIS with Collector
	Section	Lab 6 – Further Geodatabase Behavior/Introduction to Mobile GIS
14	4/13	RIVERWOODS TRIP: 4/17 to 4/18
	Section	
15	4/20	Raster Data Analysis
	Section	Quiz 7, Lab 4 – Spatial Analyst,
16	4/27	Term Project
	Section	Quiz 8
17	5/4	Term Project Presentations