SURVEYING AND MAPPING

The Geomatics profession collects, manages, and analyzes geospatial data through ground surveying, photogrammetry, remote sensing, satellite positioning, inertial measurements, echo-sounding, and laser scanning. Geomatics students study geometry, statistics, boundary law, and surveying and mapping instrument usage.

About this Program

- **College:** Agricultural and Life Sciences (http://catalog.ufl.edu/UGRD/colleges-schools/UGAGL/)
- **Degree:** Bachelor of Science in Geomatics
- **Specializations:** Geospatial Analysis (http://catalog.ufl.edu/UGRD/colleges-schools/UGAGL/GEM_BSGE/GEM_BSGE01/) | Surveying and Mapping (p. 1)
- **Credits for Degree:** 120

To graduate with this major, students must complete all university, college, and major requirements.

School Information

The School of Forest, Fisheries, and Geomatics Sciences is a unit within the Institute of Food and Agricultural Sciences (IFAS) and the College of Agricultural and Life Sciences (CALS). The school is home to three distinct yet integrated program areas: Fisheries and Aquatic Sciences (http://sfrc.ufl.edu/fish/), Forest Resources and Conservation (http://sfrc.ufl.edu/forest/), and Geomatics (http://sfrc.ufl.edu/geomatics/). The school's faculty, staff, and students conduct research, teaching, and extension that cuts across a wide range of environments and disciplines.
Website (http://sfrc.ufl.edu/)

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Map (http://campusmap.ufl.edu/#/index/0832)

Curriculum

- Combination Degrees
- Environmental Policy, Law, and Regulation Certificate
- Fire Ecology and Management Certificate
- Fisheries and Aquatic Sciences Minor
- Forest Health Management Certificate
- Forest Resources and Conservation
- Forest Resources and Conservation Minor
- Geomatics
- Geomatics Certificate
- Mapping with Small Unmanned Aerial Systems Certificate
- Marine Sciences | CALS
- Natural Resource Conservation
- Recreation Resources Management Certificate
- Urban Forestry Certificate

Geomatics students learn how land, infrastructure, and natural resources are measured, analyzed, and integrated into useable forms and systems. Students gain hands-on experience working with field equipment and in high-tech classrooms. Present land values, rates of urban development, and environmental concerns require a broad set of expertise to develop, manage, and apply geospatial information. Students majoring in Geomatics complete either the Surveying and Mapping specialization or the Geospatial Analysis specialization.

Both specializations within the Geomatics major are offered at the Fort Lauderdale Research and Education Center in Ft. Lauderdale, FL, and the Gulf Coast Research and Education Center in Plant City, FL (near Tampa).

Surveying and Mapping

The Surveying and Mapping specialization prepares students for entry into the Surveying and Mapping profession.

Critical Tracking

Critical Tracking records each student's progress in courses that are required for progress toward each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (https://cpm.flvc.org/advance-search/) may be used for transfer students.

Check the Model Semester Plan for a list of approved courses and substitutions.

Semester 1

- Complete at least 1 of 7 critical-tracking courses (excluding labs): AEB 2014 or ECO 2023 or ECO 2013, AEC 3030C or SPC 2608, COP 2800 or advisor-approved course in computer programming, MAC 2311, PHY 2053/PHY 2053L, PHY 2054/PHY 2054L and STA 2023
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 2

- Complete at least 2 additional critical-tracking courses, excluding labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 3

- Complete at least 2 additional critical-tracking courses, excluding labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 4

- Complete at least 2 additional critical-tracking courses, excluding labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 5

- Complete all critical-tracking courses including labs
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 6

- Complete two of the remaining required major courses from SUR 3103C, SUR 3323, SUR 3641, SUR 4350C, GIS 3072C, AEB 3133 or MAN 3025, AEB 4123 or BUL 4310, SUR 3331C, SUR 4501C, SUR 3520, SUR 4350C, SUR 4949, FNR 3131C or FNR 3073, SUR 4530, SUR 4911, SUR 4380, SUR 4912, and SUR 4345 or SWS 4244 or AOM 4643 or FNR 4343C or FNR 4660 or GEO 3280
- 2.0 upper division GPA required
- 2.0 UF GPA required

Semester 7

- Complete three additional remaining required major courses from SUR 3103C, SUR 3323, SUR 3641, SUR 4350C, GIS 3072C, AEB 3133 or MAN 3025, AEB 4123 or BUL 4310, SUR 3331C, SUR 4501C, SUR 3520, SUR 4949, FNR 3131C or FNR 3073, SUR 4530, SUR 4911, SUR 4380, SUR 4912, and SUR 4345 or SWS 4244 or AOM 4643 or FNR 4343C or FNR 4660 or GEO 3280
- 2.0 upper division GPA required
- 2.0 UF GPA required

Semester 8

- Complete all remaining required major courses from SUR 3103C, SUR 3323, SUR 3641, SUR 4350C, GIS 3072C, AEB 3133 or MAN 3025, AEB 4123 or BUL 4310, SUR 3331C, SUR 4501C, SUR 3520, SUR 4949, FNR 3131C or FNR 3073, SUR 4530, SUR 4911, SUR 4380, SUR 4912, and SUR 4345 or SWS 4244 or AOM 4643 or FNR 4343C or FNR 4660 or GEO 3280

- 2.0 upper division GPA required
- 2.0 UF GPA required

Model Semester Plan

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.

Course	Title	Credits
Semester One		
Quest 1 (Gen Ed Humanities)		3
Select one:		3-4
AEB 2014	Current Economic Issues, Food and You (**Critical Tracking**; Gen Ed Social and Behavioral Sciences)	
ECO 2013	Principles of Macroeconomics (**Critical Tracking**; Gen Ed Social and Behavioral Sciences)	
ECO 2023	Principles of Microeconomics (**Critical Tracking**; Gen Ed Social and Behavioral Sciences)	
State Core Gen Ed Composition (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Writing Requirement		3
Gen Ed Biological or Physical Sciences [1]		3-4
Elective [2]		3-4
	Credits	**15-18**
Semester Two		
Select one:		3
COP 2800	Computer Programming Using JAVA (**Critical Tracking**)	
COP 2271 & 2271L	Computer Programming for Engineers and Computer Programming for Engineers Laboratory (**Critical Tracking**)	
COP 3275	Computer Programming Using C (**Critical Tracking**)	
Approved computer programming course (**Critical Tracking**)		
MAC 2311	Analytic Geometry and Calculus 1 (**Critical Tracking**; State Core Gen Ed Mathematics) [3]	4
State Core Gen Ed Humanities (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
State Core Gen Ed Social and Behavioral Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
Elective		2
	Credits	**15**
Semester Three		
PHY 2053 & 2053L	Physics 1 and Laboratory for PHY 2053 (**Critical Tracking**; State Core Gen Ed Biological Sciences and Physical Sciences) [3]	5
STA 2023	Introduction to Statistics 1 (**Critical Tracking**; Gen Ed Mathematics)	3
Gen Ed Composition; Writing Requirement		3
Elective [4]		3-4
	Credits	**14-15**
Semester Four		
Quest 2 (Gen Ed Social and Behavioral Sciences and International)		3
Select one:		3
AEC 3030C	Effective Oral Communication (**Critical Tracking**)	
SPC 2608	Introduction to Public Speaking (**Critical Tracking**)	
PHY 2054 & 2054L	Physics 2 and Laboratory for PHY 2054 (**Critical Tracking**; Gen Ed Physical Sciences) [3]	5
Gen Ed International (requirement not fulfilled by the Quest 2 course)		3
Elective		2
	Credits	**16**
Semester Five		
Select one:		3
AEC 3033C	Research and Business Writing in Agricultural and Life Sciences (Writing Requirement)	
ENC 2210	Technical Writing (Writing Requirement)	
ENC 3246	Professional Communication for Engineers	
ENC 2256	Writing in the Disciplines	
SUR 3103C	Geomatics [5]	3
SUR 3323	Visualization of Spatial Information [5]	3

GIS 3072C	Geographic Information Systems [5]	3
SUR 3641	Survey Computations [5]	3
	Credits	**15**
Semester Six		
AEB 3133	Principles of Agribusiness Management (**Critical Tracking**)	3-4
or MAN 3025	or Principles of Management	
AEB 4123	Agricultural and Natural Resource Law (**Critical Tracking**)	3-4
or BUL 4310	or The Legal Environment of Business	
SUR 3331C	Photogrammetry (**Critical Tracking**) [5]	3
SUR 4501C	Foundations of UAS Mapping (**Critical Tracking**) [5]	3
SUR 3520	Measurement Science (**Critical Tracking**) [5]	3
	Credits	**15-17**
Summer After Semester Six		
SUR 4949	Co-op Work Experience (**Critical Tracking**) [6]	2
	Credits	**2**
Semester Seven		
Select one:		2-3
FNR 3131C	Dendrology/Forest Plants (**Critical Tracking**)	
FNR 3073	Florida's Forest Communities (**Critical Tracking**)	
SUR 4201	Route Geometrics and Design [5]	3
SUR 4350C	Advanced Photogrammetry (**Critical Tracking**) [5]	3
SUR 4403	Cadastral Principles [5]	3
SUR 4530	Geodesy and Geodetic Positioning (**Critical Tracking**) [5]	3
SUR 4911	Supervised Research in Geomatics (**Critical Tracking**)	1
	Credits	**15-16**
Semester Eight		
SUR 4380	Remote Sensing (**Critical Tracking**) [5]	3
SUR 4430	Surveying and Mapping Practice [5]	3
SUR 4463	Subdivision Design [5]	3
SUR 4912	Senior Project (**Critical Tracking**) [5]	1
Natural resources elective; **Critical Tracking**		3
	Credits	**13**
	Total Credits	**120**

1 FNR 3004 or SWS 3022 and SWS 3022L recommended.

2 GEO 2200 or GLY 2010C recommended.

3 May be used as substitutes:
- MAC 1114 and MAC 2233 for MAC 2311
- (PHY 2004 and PHY 2004L) or (PHY 2048 and PHY 2048L) for PHY 2053 and PHY 2053L
- (PHY 2005 and PHY 2005L) or (PHY 2049 and PHY 2049L) for PHY 2054 and PHY 2054L

4 GEO 2200 or GLY 2010C recommended, if not already taken.

5 Minimum grade of C required.

6 Must take two sections of SUR 4949 concurrently.

Placement tests or prerequisites may be required to access certain courses.

Non-specified General Education courses may be selected from any approved course in the subject area. Selection of courses must consider satisfaction of the Writing Requirement and International requirements.

Approved Electives

Code	Title	Credits
Natural Resources Electives		
Select one:		3
AOM 4643	Environmental Hydrology: Principles and Issues	
FNR 4343C	Forest Water Resources	
FNR 4660	Natural Resource Policy and Economics	
GEO 3280	Principles of Geographic Hydrology	
SUR 4345	Marine Geomatics	

SWS 4244	Wetlands	
Analysis Electives		
Select at least one:		3-4
FNR 3410C	Natural Resource Sampling	
GEO 3162C	Introduction to Quantitative Analysis for Geographers	
QMB 3250	Statistics for Business Decisions	
STA 3024	Introduction to Statistics 2	
STA 3032	Engineering Statistics	
Geospatial Application Electives		
Select at least one:		1-4
AOM 4434	Precision Agriculture	
EES 4050	Environmental Planning and Design	
GIS 3001C	Geovisualization and Map Design	
GIS 3420C	GIS Models for Public Health	
GIS 4037	Digital Image Processing	
GIS 4113	Introduction to Spatial Networks	
SUR 4940C	Practicum in UAS Mapping [1]	3
SUR 4376	Geospatial Applications of UASs [1]	3
Geomatics Electives		
Select at most one:		3
SUR 4201	Route Geometrics and Design [1]	
SUR 4403	Cadastral Principles [1]	
SUR 4430	Surveying and Mapping Practice [1]	
SUR 4463	Subdivision Design [1]	
SUR 4934	Topics in Geomatics [1]	

[1] Minimum grade of C required

Academic Learning Compact

Geomatics addresses land information development and management through field survey, photogrammetry, remote sensing, satellite positions, and other techniques. The program is nationally accredited and graduates often obtain licensure as professional surveyors and mappers.

A nationally accredited ABET (http://www.abet.org/) program.

Before Graduating Students Must

- Pass the geomatics competency exam, given in five parts. One part will be given in each of these required courses:

Code	Title	Credits
SUR 3103C	Geomatics	3
SUR 3520	Measurement Science	3
SUR 4430	Surveying and Mapping Practice	3
SUR 4463	Subdivision Design	3
SUR 4912	Senior Project	1
Total Credits		**13**

- Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major Will Learn to

Student Learning Outcomes | SLOs

Content

1. Knowledge and competency in geometry, statistics, boundary law, surveying, and mapping instrument usage and statutes and ordinances pertaining to professional practice.

Critical Thinking

2. Define problems, formulate solutions, assess legal evidence, interpret statistical results, design a system or process, and understand professional and ethical issues.

Communication

3. Create, interpret and analyze written text, oral messages, and multimedia presentations.

Curriculum Map

I = Introduced; R = Reinforced; A = Assessed

Courses	SLO 1	SLO 2	SLO 3
SUR 3103C	I, R, A	I, R, A	I, R, A
SUR 3520		I, R, A	I, R, A
SUR 4430	I, R, A	R, A	R, A
SUR 4463	R, A	R, A	R, A
SUR 4912		R, A	R, A

Assessment Types

- Labs
- Projects
- Papers
- Exams
- Presentations