GEOMATICS | SURVEYING AND MAPPING

Geomatics is a Science, Technology, Engineering, and Mathematics (STEM) major that addresses spatial data collection, management, and analysis. Traditionally known for surveying and mapping, Geomatics also has some more well-known applications such as Geographic Information Systems (GIS), Global Positioning Systems (GPS), and even Unmanned Aerial Vehicles (UAVs). Spatial data is collected through many techniques such as ground surveying, photogrammetry, remote sensing, satellite positioning, inertial measurements, echo-sounding, and laser scanning. Spatial information collected may then be integrated into a geographic information system or other graphical form and analyzed to support a broad range of applications. For instance, Geomatics uses this technology to detect how and where things are located, and uses this information for a variety of purposes, including establishing property boundaries, locating and documenting historical buildings, analyzing ecological data including habitat types and species migration patterns, designing new roads and other infrastructure, and much more.

About this Program

- **College:** Agricultural and Life Sciences
- **Degree:** Bachelor of Science in Geomatics
- **Credits for Degree:** 120
- **Specializations:** Geospatial Analysis | Surveying and Mapping
- **Additional Information**
- **Related Geomatics Programs**

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

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, the Gulf Coast Research and Education Center in Plant City, FL and at the Mid-Florida Research and Education Center in Apopka, FL.

Related Geomatics Programs

- Geomatics certificate
- Mapping with Small Unmanned Aerial Systems certificate

Surveying and Mapping

The Surveying and Mapping specialization is accredited by ABET and 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 entry to 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 may be used for transfer students.

**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

**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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AEB 2014</td>
<td>Economic Issues, Food and You (Critical Tracking: Gen Ed Social and Behavioral Sciences)</td>
<td>3-4</td>
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<tr>
<td>ECO 2013</td>
<td>Principles of Macroeconomics (Critical Tracking: Gen Ed Social and Behavioral Sciences)</td>
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<tr>
<td>ECO 2023</td>
<td>Principles of Microeconomics (Critical Tracking: Gen Ed Social and Behavioral Sciences)</td>
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<tr>
<td>IUF 1000</td>
<td>What is the Good Life (Gen Ed Humanities)</td>
<td>3</td>
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</tbody>
</table>
Semester Two
Select one:
COP 2800  Computer Programming Using JAVA  
& 2271L  Computer Programming for Engineers  
COP 3275  Computer Programming Using C  
COP 3229  Computer Programming Using C++  
Approved computer programming course  
MAC 2311  Analytic Geometry and Calculus  
STA 2023  Introduction to Statistics  
Gen Ed Composition; Writing Requirement  
Elective  
Credits  
Semester Three
PHY 2053 & 2053L  Physics 1 and Laboratory for Physics  
STA 2023  Introduction to Statistics  
Gen Ed Composition; Writing Requirement  
Elective  
Credits  
Semester Four
Select one:
AEC 3030C  Effective Oral Communication  
SPC 2608  Introduction to Public Speaking  
PHY 2054 & 2054L  Physics 2 and Laboratory for Physics  
Select 6 credits:
Gen Ed Diversity and International  
Gen Ed Diversity or International and/or Social and Behavioral Sciences  
Elective  
Credits  
Semester Five
Select one:
AEC 3033C  Research and Business Writing in Agricultural and Life Sciences  
ENC 2210  Technical Writing  
ENC 3254  Professional Writing in the Discipline  
SUR 3103C  Geomatics  
SUR 3323  Visualization of Spatial Information  
GIS 3072C  Geographic Information Systems  
SUR 3641  Survey Computations  
Credits  
Semester Six
AEB 3133  Principles of Agribusiness Management  
AEB 4123  Agricultural and Natural Resource Law  
SUR 3331C  Photogrammetry  
SUR 4501C  Foundations of UAS Mapping  
SUR 3520  Measurement Science  
Credits  
Semester Seven
Select one:
FNR 3131C  Dendrology/Forest Plants  
FOR 4934  Topics in Natural Resources (Florida Forest Communities)  
SUR 4201  Route Geometrics and Design  
SUR 4350C  Advanced Photogrammetry  
SUR 4403  Cadastral Principles  
SUR 4530  Geodesy and Geodetic Positioning  
SUR 4911  Supervised Research in Geomatics  
Credits  
Semester Eight
SUR 4380  Remote Sensing  
SUR 4430  Surveying and Mapping Practice  
SUR 4463  Subdivision Design  
SUR 4512  Senior Project  
Natural resources elective  
Credits  
Total Credits  
Approved Electives
Code  Title  Credits
Natural Resources Electives
Select one of the following:
ADM 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 4934  Topics in Geomatics (Marine Geomatics)  
SWS 4244  Wetlands  
1 FOR 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 for PHY 2053 and PHY 2053L  
   • PHY 2005 and PHY 2005L for PHY 2054 and PHY 2054L  
4 GEO 2200 or GLY 2010C recommended, if not already taken.  
5 Minimum grade of C required.  
 Placement tests and/or prerequisites may be required to access certain courses.  
Non-specified general education (GE) courses may be selected from any approved course in the subject area. Selection of courses must consider satisfaction of the writing requirement and international studies and diversity requirements.
Analysis Electives
Select at least one of the following: 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 of the following: 1-4
AOM 4434  Precision Agriculture
EES 4050  Environmental Planning and Design
FNR 4461  Spatial Models and Decision Analysis
GIS 3420C  GIS Models for Public Health
GIS 4001C  Maps and Graphs
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 of the following: 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

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

<table>
<thead>
<tr>
<th>Courses</th>
<th>SLO 1</th>
<th>SLO 2</th>
<th>SLO 3</th>
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<tbody>
<tr>
<td>SUR 3103C</td>
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<td>I, R, A</td>
<td>I, R, A</td>
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<tr>
<td>SUR 3520</td>
<td>I, R, A</td>
<td>I, R, A</td>
<td>I, R, A</td>
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<tr>
<td>SUR 4430</td>
<td>I, R, A</td>
<td>R, A</td>
<td>R, A</td>
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<tr>
<td>SUR 4463</td>
<td>R, A</td>
<td>R, A</td>
<td>R, A</td>
</tr>
<tr>
<td>SUR 4912</td>
<td>R, A</td>
<td>R, A</td>
<td>R, A</td>
</tr>
</tbody>
</table>

Assessment Types
• Labs
• Projects
• Papers
• Exams
• Presentations

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 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:

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SUR 3103C</td>
<td>Geomatics</td>
<td>3</td>
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<tr>
<td>SUR 3520</td>
<td>Measurement Science</td>
<td>3</td>
</tr>
<tr>
<td>SUR 4430</td>
<td>Surveying and Mapping Practice</td>
<td>3</td>
</tr>
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<td>SUR 4463</td>
<td>Subdivision Design</td>
<td>3</td>
</tr>
<tr>
<td>SUR 4912</td>
<td>Senior Project</td>
<td>1</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>13</td>
</tr>
</tbody>
</table>

• 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.