

## Geomatics Engineering

The program of study leading to the Bachelor of Science in -Geomatics Engineering (B.S.G.E.) deals with designing solutions to measure, map, model, analyze, and graphically display the real world. Graduates will explore cutting edge technology in image processing, digital photogrammetry, remote sensing, satellite-based global positioning, geographic information systems, laser scanning, and digital mapping. program strongly relates to environmental disciplines, such as geology and geography (geosciences), and it is also closely aligned with civil engineering and with urban and regional planning. It is not uncommon for an individual to be licensed as both a professional engineer and a professional surveyor.

The program of study leading to the Bachelor of Science in Geomatics Engineering (B.S.G.E.) reflects the expanse of the profession. Students complete coursework in basic science and mathematics, engineering sciences and the main disciplines in geomatics engineering. Because of the major impact geomatics engineers have on society, the curriculum also requires students to complete the Intellectual Foundations Program, pursue studies in the social sciences and the humanities.

### Geomatics Engineering Vision and Mission

The Geomatics Engineering program delivers a quality educational experience in surveying, mapping and emerging geomatics technologies throughout the FAU service area and beyond and makes a significant contribution to the needs of a growing South Florida community. Program faculty focuses on student-centered learning methodologies that transform students into ~~are~~ active learners, motivated to serve society.

This program values ethical behavior, critical thinking, innovation, individual responsibility, thoughtful risk taking, teamwork and leadership.

### Geomatics Engineering Educational Objectives and Outcomes

The Geomatics Engineering Program supports the Program educational objectives are broad statements that describe the expected accomplishments and professional status of Geomatics Engineering graduates a few years beyond the baccalaureate degree, and learning outcomes of the College of Engineering and Computer Science (see the Educational Objectives and Expected Student Learning Outcomes subsections previously listed in this section).

The Geomatics Engineering is designed for the following: has established the following additional educational outcomes for undergraduates. Graduates will: Geomatics Engineering has the following program educational objectives:

1. ~~1.~~ Be proficient in the following geomatics engineering disciplines: plane, construction and engineering surveying, remote sensing, photogrammetry, geographic information systems, automated surveying systems and legal and business practices;
2. Have an appreciation for the role of geomatics engineering in infrastructure and

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environmental planning;

3. Achieve success in finding professional employment and/or pursuing further academic studies.

The Geomatics Engineering program outcomes are:

- a) An ability to apply knowledge of mathematics, science, and engineering.
- b) An ability to design and conduct experiments, as well as to analyze and interpret data.
- c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
- d) An ability to function on multi-disciplinary teams.
- e) An ability to identify, formulate, and solve engineering problems.
- f) An understanding of professional and ethical responsibility.
- g) An ability to communicate effectively.
- h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- i) A recognition of the need for, and an ability to engage in life-long learning—specifically: graduates will be successful in finding professional employment, attaining professional licensure, and/or pursuing further academic studies.
- j) A knowledge of contemporary issues.
- k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice—specifically: Graduates will have an advanced understanding of the following areas of Geomatics Engineering: 1) Surveying, including but not limited to, boundary and land surveying, subdivision and plat creation, control surveys, and construction surveys, 2) geographic information systems (GIS), 3) photogrammetry and remote sensing 4) mapping, to include but not limited, to topographic maps, cadastral maps, and land use maps, 5) geodesy, and 6) Global Navigation Satellite Positioning Systems (GPS, GLONASS, etc).

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## Bachelor of Science in Geomatics Engineering

### Admission Requirements

All students must meet the minimum admission requirements of the University. Please refer to the [Admissions section](#) of this catalog.

All students must meet the pre-professional requirements listed [above](#) in order to be accepted into the Geomatics Engineering program.

### Prerequisite Coursework for Transfer Students

Students transferring to Florida Atlantic University must complete both lower-division requirements (including the requirements of the Intellectual Foundations Program) and requirements for the college and major. Lower-division requirements may be completed through

the A.A. degree from any Florida public college, university or community college or through equivalent coursework at another regionally accredited institution. Before transferring and to ensure timely progress toward the baccalaureate degree, students must also complete the prerequisite courses for their major as outlined in the *Transfer Student Manual* (see [www.fau.edu/registrar/tsm.php](http://www.fau.edu/registrar/tsm.php)).

All courses not approved by the Florida Statewide Course Numbering System that will be used to satisfy requirements will be evaluated individually on the basis of content and will require a catalog course description and a copy of the syllabus for assessment.

#### Coursework for Transfer Students

In order to minimize the time necessary to complete the Geomatics Engineering degree, transfer students entering the University with an A.A. degree should structure their programs to include the following:

Topics	Credits (1)	
English Composition	6	(two 3-credit courses)
Social Science	6	(two 3-credit courses)
Humanities	6	(two 3-credit courses)
Public Speaking	3	(one 3-credit course)
Complete Calculus Sequence	12	(three 4-credit courses)
Differential Equations	3	(one 3-credit course)
General Chemistry, with Lab	4	(one 4-credit course, including lab)
<a href="#">Calculus based Engineering</a> Physics, with Labs	8	(two 4-credit courses, including labs)
Fundamentals of/Introduction to Engineering (2)	3	(one 3-credit course)

Notes:

- (1) The number of credits may vary by institution.
- (2) An introductory course in engineering is preferred. However, substitutions may be allowed, provided they are part of a cohesive pre-engineering A.A. degree program.

#### Degree Requirements

The Bachelor of Science in Geomatics Engineering degree will be awarded to students who:

1. Meet all general degree requirements of the University;
2. Complete the curriculum for the B.S.G.E. in Geomatics Engineering degree (see below);
3. Take the National Council of Examiners for Engineering and Surveying (NCEES)

Fundamentals of Surveying Examination (the first of ~~four~~ two exams necessary for the professional surveyors and mappers license). Contact Geomatics Engineering for details.

### Curriculum

The Bachelor of Science in Geomatics Engineering degree requires 120 credits. For credit toward the degree, a grade of “C” or better must be received in each course listed, except for humanities and social science courses not applied toward Writing Across Curriculum (Gordon Rule) writing requirements. In addition, all prerequisites for each mathematics, science or engineering course must be completed with a grade of “C” or better before enrollment is permitted. The degree components are listed below.

General Studies		
College Writing 1 (1),(2)	ENC 1101	3
College Writing 2 (1),(2)	ENC 1102	3
Public Speaking	SPC 2608+	3
Intellectual Foundations Program: Society and Human Behavior Courses (1), (3)		6
Intellectual Foundations Program: Global Citizenship Courses Social Sciences (1),(3),(4)		6
Intellectual Foundations Program: Creative Expressions Courses Humanities (1),(3),(4)		6
Total		24

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Basic Mathematics and Sciences		
Calculus for Engineers 1 (1),(4)	MAC 2281	4
Calculus for Engineers 2 (1),(4)	MAC 2282	4
Calculus with Analytic Geometry 3	MAC 2313	4
Engineering Math 1	MAP 3305	3
Probability and Statistics for Engineers	STA 4032	3
Engineering General Chemistry 1 (1)	EGN 2095 CHM 2045	3
Engineering General Chemistry 1 Lab (1)	EGN 2095L CHM 2045L	1
Physics for Engineers 1 (1),(5)	PHY 2043	3
General Physics 1 Lab	PHY 2048L	1
Physics for Engineers 2 (1),(5)	PHY 2044	3

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General Physics 2 Lab	PHY 2049L	1
Total		30

Engineering Fundamentals		
Fundamentals of Engineering	EGN 1002	3
Introduction to Geomatics Engineering	SUR 2034	3
Total		6

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Professional Core (67)		
<del>Plane Fundamentals of</del> Surveying	<del>SUR 2101</del> <u>SUR 2104C</u>	3
Plane Surveying Lab	SUR 2101L	1
Introduction to Mapping and GIS (78)	GIS 3015C	3
Surveying Data Analysis	SUR 3643	3
Photogrammetry (89)	SUR 3331	2
Photogrammetry Lab (89)	SUR 3331L	1
Automated Surveying and Mapping	SUR 3141	3
Automated Surveying and Mapping Lab	SUR 3141L	1
Principles of Geographic Information Systems (78)	GIS 4043C	3
Introduction to Geodesy	SUR 3530	3
Engineering and Construction Surveying	SUR 3205	3
Engineering and Construction Surveying Lab	SUR 3205L	1
Land Subdivision and Platting	SUR 3463	2
Land Subdivision and Platting Lab	SUR 3463L	1
Geomatics Engineering Design 1	SUR 4670	3
Remote Sensing of the Environment (78)	GIS 4035C	3
Legal Aspects of Surveying	SUR 4403	3
Positioning with GPS	SUR 4531	2
Positioning with GPS Lab	SUR 4531L	1
Engineering Economics	EGN 4613	3
Geomatics Engineering Design 2	SUR 4672	3
<del>Hydrographic Surveying with Lab (7)</del>	<del>SUR 4302</del>	3
<del>Surveying Business Practices</del>	<del>SUR 4430</del>	
Professional Electives (select 2) (10)	-	6
Total		517

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<del>Professional</del> Technical Electives (Select 2)		
Students select 6 credits from a list of approved <del>professional</del> technical electives.		
<del>Introduction to Physical Geography</del>	<del>GEO 2200C</del>	<del>3</del>
<del>Coastal and Marine Science</del>	<del>GLY 3730</del>	<del>3</del>
Programming in GIS	GIS 4102C	3
Field Methods	GLY 4750C	3
Hydrogeology	GLY 4822	3
Transportation and Spatial Organization	GEO 4700	3
Application in GIS	GIS 4048C	3
Introduction to Hydrogeology Modeling and Aquifer Test	GLY4832C	3
Digital Image Analysis	GIS 4137C	3
Geovisualization and GIS	GIS 4138C	3
Engineering Geology	GLY 4830	3
<del>Physical Geology/Evolution of Earth</del>	<del>GLY 2010</del>	<del>3</del>
<del>Physical Geology/Evolution of Earth Lab</del>	<del>GLY 2010L</del>	<del>1</del>
Entrepreneurship	ENT 4024	3
Business Law	BUL 4421	3
Transportation Planning and Management	TTE 4105	3
Construction Project Management	CCE4031	3
GIS for Civil Engineering Applications	CGN 4321	3
Total		6

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#### Notes

Notes:

- (1) Contributes to University Core Curriculum requirements.
- (2) Contributes to Writing Across Curriculum (Gordon Rule) writing requirement.
- (3) [Intellectual Foundations Program Social Sciences/Humanities](#) courses, totaling 6 or more credits, must be selected to satisfy Writing Across Curriculum (Gordon Rule) writing requirements.
- (4) ~~Two or more of the selections must have a global perspective (contact the department for a list of acceptable courses).~~
- (45) Contributes to Gordon Rule mathematics requirement.
- (56) PHY 2048 and PHY 2049 (4 credits each) are acceptable substitutes, but only 6 credits will

apply toward the degree.

(67) All professional core courses contain a communications component (writing or speaking).

(78) Includes a 1-credit laboratory.

(89) GIS 4023 is an acceptable substitute.

(10) See advisor for the list of approved professional electives.

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Sample Four-Year Program of Study for Bachelor of Science in Geomatics Engineering

First Year, Fall (14 credits)		
College Writing 1	ENC 1101	3
<a href="#">Engineering General</a> Chemistry 1	<a href="#">EGN 2095</a> <a href="#">CHM 2045</a>	3
<a href="#">Engineering General</a> Chemistry 1 Lab	<a href="#">EGN 2095L</a> <a href="#">CHM 2045L</a>	1
Calculus for Engineers 1	MAC 2281	4
Fundamentals of Engineering	EGN 1002	3

First Year, Spring (14 credits)		
College Writing 2	ENC 1102	3
Physics for Engineers 1	PHY 2043	3
General Physics 1 Lab	PHY 2048L	1
Calculus for Engineers 2	MAC 2282	4
<a href="#">Intellectual Foundations Program Course Social Science/Humanities</a>		3

Second Year, Fall (14 credits)		
Physics for Engineers 2	PHY 2044	3
General Physics 2 Lab	PHY 2049L	1
Calculus with Analytic Geometry 3	MAC 2313	4
Introduction to Geomatics Engineering	SUR 2034	3
<a href="#">Intellectual Foundations Program Course Social Science/Humanities</a>		3

Second Year, Spring (16 credits)		
Introduction to Mapping and GIS	GIS 3015C	3
Engineering Math 1	MAP 3305	3

<del>Plane</del> <u>Fundamentals of</u> Surveying	SUR <del>2101</del> 2104	3
Plane Surveying Lab	SUR 2101L	1
Public Speaking	SPC 2608+	3
<u>Intellectual Foundations Program Course</u> <u>Social Science/Humanities</u>		3

LAB

Third Year, Fall (16 credits)		
Surveying Data Analysis	SUR 3643	3
Photogrammetry	SUR 3331	2
Photogrammetry Lab	SUR 3331L	1
Automated Surveying and Mapping	SUR 3141	3
Automated Surveying and Mapping Lab	SUR 3141L	1
Probability and Statistics for Engineers	STA 4032	3
<u>Intellectual Foundations Program Course</u> <u>Social Science/Humanities</u>		3

Third Year, Spring (16 credits)		
Principles of Geographic Information Systems	GIS 4043C	3
Introduction to Geodesy	SUR 3530	3
Engineering and Construction Surveying	SUR 3205	3
Engineering and Construction Surveying Lab	SUR 3205L	1
Land Subdivision and Platting	SUR 3463	2
Land Subdivision and Platting Lab	SUR 3463L	1
<u>Intellectual Foundation Program Course</u> <u>Social Science/Humanities</u>		3



Fourth Year, Fall (15 credits)		
Geomatics Engineering Design 1	SUR 4670	3
Remote Sensing of the Environment	GIS 4035C	3
Legal Aspects of Surveying	SUR 4403	3
Positioning with GPS	SUR 4531	2
Positioning with GPS Lab	SUR 4531L	1
Engineering Economics	EGN 4613	3

Fourth Year, Spring (15 credits)		
Geomatics Engineering Design 2	SUR 4672	3
<a href="#">Hydrographic Surveying with Lab</a> <a href="#">Surveying Business Practices</a>	SUR 4302/430	3
<a href="#">Professional Technical</a> Electives (select 2)		6
<a href="#">Intellectual Foundations Program Course</a> <a href="#">Social Science/Humanities</a>		3

#### Minors and Certificate Programs Appropriate for Geomatics Engineering

Geomatics engineering encompasses many disciplines. Various departments offer minors and certificate programs that augment a student's geomatics engineering education. Students are encouraged to pursue a minor or certificate, [such as:- Areas especially appropriate for geomatics engineering include:](#)

Business Administration (College of Business)

[Economics \(Department of Economics\)](#)

[French, German, Japanese, Italian or Spanish](#)

[\(Department of Languages, Linguistics, and Comparative Literature\)](#)

[International Economics \(Department of Economics\)](#)

Geographic Information Systems (Department of Geosciences) certificate program (highly recommended)

Geography (Department of Geosciences)

Geology (Department of Geosciences)

Mathematics (Department of Mathematical Sciences)


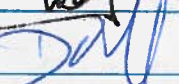

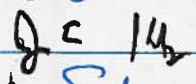

[Public Management \(School of Public Administration\)](#)

Statistics (Department of Mathematical Sciences)

Obtaining a minor or certificate will require completing credits beyond the 120 required for the B.S.G.E. in Geomatics Engineering. Contact the department offering the minor or certificate for more details.

### Cooperative Education

Geomatics Engineering majors are strongly encouraged to gain practical experience through participation in Cooperative Education. For information, contact the Office of Engineering Career Development at 561-297-2694.

<u>Approved by:</u>	<u>Date:</u>
Department Chair: 	10/13/13
College Curriculum Chair: 	10/30/13
College Dean: 	10/31/13
UUPC Chair: 	11/1/13
Undergraduate Studies Dean: 	11/4/13