GEOMATICS - BACHELOR OF SCIENCE IN GEOMATICS

Geomatics is a rapidly developing engineering discipline that focuses on acquiring and analyzing precise spatial information. Geomatics engineers use a variety of technologies such as Unmanned Aerial Vehicles, Global Navigation Satellite Systems, High-Definition 3D Laser scanners, High-resolution satellite images, and Geographic Information Systems. They measure terrestrial and three-dimensional positions of points on, above, and below the earth's surface and the distance and angles between them at a high level of precision. Geomatics engineers aid in the design of infrastructure including roads, bridges and legal boundaries for ownership. They provide precise data for natural resource managers, subdivision developers, and coastal monitoring systems.

The program is designed to provide cutting-edge industrial needs as well as to meet the educational requirements for registration as a Professional Land Surveyor in different states.

The mission of the Department of ETSE is to provide men and women with the rigorous, fundamental education needed to enter and succeed in the Geomatics and related professions. To accomplish this mission, the department will introduce students to the theory and application of recognized geomatics principles.

The Geomatics degree is offered online as a degree completion program. As part of the curriculum requirements, students must complete college-level work that includes:

- Calculus I & II, Statistics, Physics I & II,
- Computer Drafting I, Computer Programming,
- Plane Surveying, and Introduction to GIS.

See the entire ET/SUR Course Listing.

Requirements (120 Credits)

Students must complete all University degree requirements, which include: General Education requirements, Viewing a Wider World requirements, and elective credits to total at least 120 credits with 48 credits in courses numbered 300 or above. Developmental coursework will not count towards the degree requirements and/or elective credits but may be needed in order to take the necessary English and Mathematics coursework.

Students must also take the Fundamentals of Surveying examination prior to graduation.

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<th>Prefix</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>General Education</td>
<td>Area I: Communications</td>
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<td>English Composition - Level 1</td>
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<td>English Composition - Level 2</td>
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<td>Oral Communication</td>
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<td>Area II: Mathematics</td>
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<tr>
<td></td>
<td>MATH 1511G Calculus and Analytic Geometry I</td>
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<td></td>
<td>or MATH 1435 Applications of Calculus I</td>
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<tr>
<td></td>
<td>Area III/IV: Laboratory Sciences and Social/Behavioral Sciences</td>
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<tr>
<td></td>
<td>PHYS 1230G Algebra-Based Physics I &amp; PHYS 1230L</td>
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<td>or PHYS 1310G Calculus-Based Physics I &amp; PHYS 1310L</td>
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One additional Area III: Laboratory Sciences (4 credits)

Area IV: Social/Behavioral Sciences Course (3 credits)

Area V: Humanities

Area VI: Creative and Fine Arts

General Education Elective

MATH 1521G Calculus and Analytic Geometry II (or equivalent can be from Transfer Credits)

or MATH 1440 Applications of Calculus II

Viewing A Wider World

Departmental/College Requirements

Transferred Credits 21-22

Transfer credits will also include the Calculus I & II and the Physics I & II requirements that will be counted in the General Education requirements (for a total of 29-31)

Any transferable Statistics course can be upper-division or lower-division

Introduction to Surveying or Engineering

Survey Drafting Applications Course

A Computer Drafting I Course

ET 109 Computer Drafting Fundamentals

or DRFT 109 Computer Drafting Fundamentals

A Computer Programming Course

ET 262 Software Technology I (or equivalent)

or OEC5 192 C++ Programming I

An Introduction to GIS Course (or equivalent)

GEOG 381 Cartography and Geographic Information Systems

or DRFT 204 Geographic Information Systems Technology

A Plane Surveying Course (or equivalent)

SUR 222 Plane Surveying

or DRFT 222 Surveying Fundamentals

Program Specific Requirements

BLAW 316 Legal Environment of Business

or BLAW 325 Real Estate Principles and Law I

ET 355 Site/Land Development and Layout

ET 421 Senior Project

GEOG 481 Fundamentals of Geographic Information Science (GIS)

IE 451 Engineering Economy

MATH 2415 Introduction to Linear Algebra

or MATH 480 Matrix Theory and Applied Linear Algebra

SUR 285 Precise Digital Mapping

SUR 292 Public Land Survey System Boundaries

SUR 312 Legal Principles and Boundary Law I

SUR 328 Construction Surveying & Automation Technologies

SUR 351 Spatial Data Adjustment I

SUR 361 Geodesy/Geodetic Control Surveying

SUR 401 Ethics and Professionalism in Surveying and Mapping

SUR 451 Spatial Data Adjustment II

SUR 452 Spatial Data Analysis

SUR 461 GNSS Positioning
Course Title Credits
SUR 464 Legal Principles and Boundary Law II 3
SUR 485 Emerging Techniques in Geospatial Technologies 3

Electeds, to bring the total credits to 120 5

Total Credits 120

1. See the General Education section of the catalog for a full list of courses.
2. For students wishing to pursue a technical master's degree, MATH 1511G Calculus and Analytic Geometry I (or equivalent) and MATH 1521G Calculus and Analytic Geometry II (or equivalent) are recommended and will satisfy both the Area II and General Education Elective requirements.
3. See the Viewing a Wider World section of this catalog for a full list of courses.
4. As part of the curriculum requirements, students must complete college-level work that includes:
   - Calculus I & II, Statistics, Physics I, and an elective science with lab
   - Computer Drafting I, Computer Programming,
   - Plane Surveying, and Introduction to GIS.
   These courses may be fulfilled with transfer credit from another institution.
5. Elective credit may vary based on prerequisites, dual credit, AP credit, double majors, and/or minor coursework. The amount indicated in the requirements list is the amount needed to bring the total to 120 credits and may appear in variable form based on the degree. However, students may end up needing to complete more or less on a case by case basis and students should discuss elective requirements with their academic advisor.

A Suggested Plan of Study for Students
This roadmap assumes students have completed the General Education requirements, which include the Mathematics prerequisites to start with MATH 2415 Introduction to Linear Algebra or MATH 480 Matrix Theory and Applied Linear Algebra. The contents and order of this roadmap may vary depending on the students transfer credits, some courses may need to be completed in addition to the ones listed below. It is only a suggested plan of study for students and is not intended as a contract. Course availability may vary from fall to spring semester and may be subject to modification or change.

Course Title Credits
First Year
Transfer 60 Credits of General Education and Electives ¹ 29
Credits 29

Second Year
Transfer 60 Credits General Education and Electives ¹ 30
Credits 30

Third Year
Fall
BLAW 316 Legal Environment of Business 3
or BLAW 325 or Real Estate Principles and Law I

MATH 2415 Introduction to Linear Algebra 3
or MATH 480

SUR 292 Public Land Survey System Boundaries 3
SUR 328 Construction Surveying & Automation Technologies 3
SUR 361 Geodesy/Geodetic Control Surveying 3

Credits 15

Spring
E T 421 Senior Project 3
GEOG 481 Fundamentals of Geographic Information Science (GIS) 4
SUR 401 Ethics and Professionalism in Surveying and Mapping 3
SUR 452 Spatial Data Integration and Analysis 3
Viewing a Wider World ² 3

Credits 16

Total Credits 120

1. Should satisfy Areas I-VI of General Education Elective requirements. See the General Education section of this catalog for a full list of courses.
2. See the Viewing a Wider World section of this catalog for a full list of courses.
3. Technical Elective: Elective credit may vary based on prerequisites, dual credit, AP credit, double majors, and/or minor coursework. The amount indicated in the requirements list is the amount needed to bring the total to 120 credits and may appear in variable form based on the degree. However, students may end up needing to complete more or less on a case by case basis and students should discuss elective requirements with their academic advisor.