

# GEOINFORMATICS AND GEOSPATIAL ANALYTICS, B.S.

Saint Louis University's Bachelor of Science program in geoinformatics and geospatial analytics prepares graduates for geospatial careers around the globe. It combines theory and practice to train the geospatial professionals of tomorrow.

SLU's Bachelor of Science in Geoinformatics and Geospatial Analytics from the Geospatial Institute and the Department of Environmental and Atmospheric Sciences is offered in cooperation with the mathematics and statistics and computer science departments. The B.S. in geoinformatics and geospatial analytics program trains students to be leading experts in the field of geospatial science. The program combines mathematical and geospatial theory with practical experience in computer science, geographic information systems (GIS), remote sensing, and global position systems.

The program prepares students for the current and future challenges of the growing geospatial industry, and to meet increasing demands for experts in geospatial intelligence, geospatial analytics, spatial modeling and statistics, photogrammetry, machine learning, artificial intelligence, and more. As an applied science, SLU's B.S. in geoinformatics and geospatial analytics program focuses on modern, global issues such as the environment, society, and economy.

Students develop a foundation in mathematical and geospatial theory and computer programming, while applying GIS, Global Positioning Systems (GPS), remote sensing, geovisualization, spatial analyses and statistics, database management, and programming skills within the natural, social science, and physical sciences using innovative technologies and software programs (e.g., ArcGIS, QGIS, ENVI+IDL, SARscape, Python, GeoDA, Google Earth Engine, R).

## Curriculum Overview

Students completing the Bachelor of Science curriculum in geoinformatics and geospatial analytics obtain a technically rigorous and applicative degree, modeled from curriculum of 70+ other programs around the United States. The B.S. degree requires credits in GIS, math and computer science in addition to core courses in the College of Arts and Sciences.

## Fieldwork and Research Opportunities

Department of Earth and Atmospheric Sciences faculty members work and conduct research in the field. They have been awarded grants from various institutions, including the National Aeronautics and Space Administration (NASA), Centers for Disease Control and Prevention, U.S. Environmental Protection Agency, Geological Society of America, National Geospatial Intelligence Agency, National Institutes of Health, National Park Service, National Science Foundation, U.S. Army Corps of Engineers, Electric Power Research Institute, Missouri Department of Natural Resources, Ameren and others.

## Careers

Graduates from programs in the Geospatial Institute (GeoSLU) are employed in careers in environmental science, remote sensing, GIS and geospatial intelligence fields. Recent graduates work for organizations

such as ESRI, the National Geospatial Intelligence Administration and the United States Geological Survey,

Globally, the geospatial industry has a current growth rate of approximately 50% a year. The St. Louis region is emerging as a global center for innovative research and technology, particularly for geospatial technology. This is driven by a vibrant entrepreneurial community, excellent research universities, a robust network of established industry thought-leaders, and the presence of the National Geospatial Intelligence Agency (NGA).

According to a recent report from St. Louis-based entrepreneurial support organization ITEN, technology positions in the region are expected to grow 60% in the next three to five years. The Missouri Department of Economic Development has estimated that the geospatial industry is growing quickly and is projected to earn \$100 billion in revenue by 2030. The geospatial industry currently accounts for 500,000 jobs nationally and Missouri will have 5,000 new jobs in the next few years, contributing roughly \$600 million to the state's economy.

## Admission Requirements

### Begin Your Application (<http://www.slu.edu/apply.php>)

Saint Louis University also accepts the Common Application.

### Freshman

All applications are thoroughly reviewed with the highest degree of individual care and consideration to all credentials that are submitted. Solid academic performance in college preparatory coursework is a primary concern in reviewing a freshman applicant's file.

To be considered for admission to any Saint Louis University undergraduate program, applicants must be graduating from an accredited high school, have an acceptable HiSET exam score or take the General Education Development (GED) test.

### Transfer

Applicants must be a graduate of an accredited high school or have an acceptable score on the GED.

Students who have attempted fewer than 24 semester credits (or 30 quarter credits) of college credit must follow the above freshmen admission requirements. Students who have completed 24 or more semester credits (or 30 quarter credits) of college credit must submit transcripts from all previously attended college(s).

In reviewing a transfer applicant's file, the Office of Admission holistically examines the student's academic performance in college-level coursework as an indicator of the student's ability to meet the academic rigors of Saint Louis University. Where applicable, transfer students will be evaluated on any courses outlined in the continuation standards of their preferred major.

### International Applicants

All admission policies and requirements for domestic students apply to international students along with the following:

- Demonstrate English Language Proficiency
- Proof of financial support must include:
  - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University
  - A letter from the sponsor's bank verifying that the funds are available and will be so for the duration of study at the University

- Academic records, in English translation, of students who have undertaken postsecondary studies outside the United States must include the courses taken and/or lectures attended, practical laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.

## Scholarships and Financial Aid

There are two principal ways to help finance a Saint Louis University education:

- Scholarships:** Scholarships are awarded based on academic achievement, service, leadership and financial need.
- Financial Aid:** Financial aid is provided in the form of grants and loans, some of which require repayment.

For priority consideration for merit-based scholarships, apply for admission by Dec. 1 and complete a Free Application for Federal Student Aid (FAFSA) by March 1.

For information on other scholarships and financial aid, visit the student financial services office online at <https://www.slu.edu/financial-aid> (<https://www.slu.edu/financial-aid/>).

## Learning Outcomes

- Students will demonstrate the ability to use geographic information systems to analyze patterns in large, complex datasets.
- Students will develop skills in communicating information regarding data, analyses, and graphics.
- Students will show proficiency in remote sensing, including the ability to acquire, process and analyze remotely sensed data.
- Students will become proficient in programming languages relevant to geographic information systems, remote sensing and computer science.

## Requirements

Code	Title	Credits
<b>Core Requirement</b>		
College core requirements (p. 2)		54-63
For additional information about core courses		
<b>Required GIS Courses</b>		
GIS 2010	Introduction to Location Science	3
GIS 2030	Spatial Analysis in GIS	3
GIS 2050	Introduction to Global Positioning Systems: Theory and Applications	3
GIS 4010	Introduction to Geographic Information Systems	3
GIS 4030	Geospatial Data Management	3
GIS 4040	Introduction to Remote Sensing	3
GIS 4050	Digital Image Processing	3
<b>Math and Statistics Courses</b>		
MATH 1510	Calculus I	4
MATH 1520	Calculus II	4
MATH 1660	Discrete Mathematics	3
STAT 3850	Foundation of Statistics	3
<b>Computer Science Courses</b>		
CSCI 1060	Introduction to Computer Science: Scientific Programming	3

or CSCI 1070	Introduction to Computer Science: Taming Big Data	
CSCI 1300	Introduction to Object-Oriented Programming	4
CSCI 2100	Data Structures	4
<b>Major Electives</b>		
Select 18 credits from courses with "Geospatial Electives" attribute		18
<b>General Electives</b>		<b>0-2</b>
<b>Total Credits</b>		<b>120-127</b>

## Continuation Standards

Students must have a minimum of a 2.00 GPA in their geoinformatics and geospatial analytics major courses and required related credits (GIS, mathematics, statistics and computer sciences) by the conclusion of their freshman year. Students who fall below a 2.00 GPA after their freshman year will be placed on probation. Students placed on probation have a maximum of one year to raise their GPA to at least a 2.0. After their freshman year, students must maintain a GPA of 2.0 to remain in good standing in the program. Students may not graduate while they are on probation. Students who do not fulfill probationary requirements will be dropped from the program.

## Bachelor of Science Core Curriculum Requirements

Code	Title	Credits
Please note: beginning in Fall 2022, all incoming SLU undergraduates –regardless of major, program, college or school–will complete the University Core curriculum. You can find more information about SLU's common Core here: <a href="https://www.slu.edu/core/index.php">https://www.slu.edu/core/index.php</a> ( <a href="https://www.slu.edu/core/">https://www.slu.edu/core/</a> )		
<b>Core Components and Credits</b>		
	Foundations of Discourse	3
	Diversity in the U.S.	3
	Global Citizenship	3
	Foreign Language	0-6
	Fine Arts	3
	Literature	6
	Mathematics	4
	Science	8
	Philosophy	6
	Social Science	6
	Theology	6
	World History	6
<b>Total Credits</b>		<b>54-60</b>

## Graduation Requirements

- Complete a minimum of 120 credits (excluding pre-college level courses numbered below 1000).
- Complete either the College of Arts and Sciences Bachelor of Arts or Bachelor of Science Core Curriculum Requirements.
- Complete major requirements: minimum 30 credits required.
- Complete remaining credits with a second major, minor, certificate, and/or electives to reach the minimum of 120 credits required for graduation.
- Achieve at least a 2.00 cumulative grade point average, a 2.00 grade point average in the major(s) and a 2.00 grade point average in the minor/certificate, or related elective credits.
- Complete department/program-specific academic and performance requirements.

- Complete at least 50% of the coursework for the major and 75% for the minor/certificate through Saint Louis University or an approved study abroad program.
- Complete 30 of the final 36 credits through Saint Louis University or an approved study abroad program.
- Complete an online degree application by the required University deadline.

## Roadmap

Roadmaps are recommended semester-by-semester plans of study for programs and assume full-time enrollment unless otherwise noted.

Courses and milestones designated as critical (marked with !) must be completed in the semester listed to ensure a timely graduation. Transfer credit may change the roadmap.

This roadmap should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor/mentor each semester. Requirements, course availability and sequencing are subject to change.

Course	Title	Credits
<b>Year One</b>		
<b>Fall</b>		
GIS 2010	Introduction to Location Science	3
HIST 1110	Origins of the Modern World to 1500	3
MATH 1510	Calculus I	4
THEO 1000	Theological Foundations	3
Core	Social Science	3
<b>Credits</b>		<b>16</b>
<b>Spring</b>		
GIS 2030	Spatial Analysis in GIS	3
HIST 1120	Origins of the Modern World (1500 to Present)	3
MATH 1520	Calculus II	4
PHIL 2050	Ethics	3
CSCI 1060 or CSCI 1070	Introduction to Computer Science: Scientific Programming or Introduction to Computer Science: Taming Big Data	3
<b>Credits</b>		<b>16</b>
<b>Year Two</b>		
<b>Fall</b>		
Science I (w/ Lab)		4
Core	THEO 2xxx	3
Core	Diversity in the U.S.	3
Core	Literature	3
MATH 1660	Discrete Mathematics	3
<b>Credits</b>		<b>16</b>
<b>Spring</b>		
Core	Social Science	3
Science II (w/ Lab) - same discipline as Science I		4
STAT 3850	Foundation of Statistics	3
GIS 2050	Introduction to Global Positioning Systems: Theory and Applications	3

ART 2150	Color Theory	3
<b>Credits</b>		<b>16</b>
<b>Year Three</b>		
<b>Fall</b>		
CSCI 1300	Introduction to Object-Oriented Programming	4
ENGL 1900 or ENGL 1940	Advanced Strategies of Rhetoric and Research or Advanced Writing	3
GIS 4010	Introduction to Geographic Information Systems	3
Geospatial	Elective	3
Geospatial	Elective	3
<b>Credits</b>		<b>16</b>
<b>Spring</b>		
CSCI 2100	Data Structures	4
GIS 4030	Geospatial Data Management	3
Geospatial	Elective	3
Core Course		3
Geospatial	Elective	3
<b>Credits</b>		<b>16</b>
<b>Year Four</b>		
<b>Fall</b>		
GIS 4040	Introduction to Remote Sensing	3
Geospatial	Elective	3
Geospatial	Elective	3
Core	Foreign Language 1010	3
<b>Credits</b>		<b>12</b>
<b>Spring</b>		
GIS 4050	Digital Image Processing	3
GIS 4960	GIS Capstone	3
PHIL 1050	Introduction to Philosophy: Self and Reality	3
Core	Foreign Language 1020	3
<b>Credits</b>		<b>12</b>
<b>Total Credits</b>		<b>120</b>