COMPUTER SCIENCE + GEOGRAPHY & GEOGRAPHIC INFORMATION SCIENCE, BSLAS

for the degree of Bachelor of Science in Liberal Arts & Sciences in Computer Science + Geography & Geographic Information Science

Everything happens *somewhere*, and Illinois is the national leader in CyberGIS — the use of high-performance, large-scale computing to answer geospatial questions. Students in CS + Geography & Geographic Information Science will develop advanced programming skills to deal with geospatial data and create new methods and tools to analyze that data.

The CS + GGIS, a blended bachelor's degree, is a partnership between the Siebel School of Computing and Data Science in The Grainger College of Engineering and the Department of Geography & Geographic Information Science in the College of Liberal Arts & Sciences. As part of the computing community at Illinois, you will benefit from being part of a top-five-ranked Computer Science program with world-class faculty and research.

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Please see the computer science advisor as well as the geography advisor.

General education: Students must complete the Campus General Education (https://courses.illinois.edu/) requirements including the campus general education language requirement.

Minimum required major and supporting course work: Normally equates to 66 hours. Twelve hours of 300- and 400-level in the major must be taken on this campus.

Minimum hours required for graduation: 120 hours.

Code	Title	Hours
Required Computer Science Courses:		
CS 100	Computer Science Orientation (recommended; CS 100 is an orientation course aimed at first-year students, so students who declare the major after the freshman year are not required to complete it.)	1
CS 124	Introduction to Computer Science I	3
CS 128	Introduction to Computer Science II	3
CS 173	Discrete Structures	3
CS 225	Data Structures	4
CS 222	Software Design Lab	1
Choose one of the following combinations		8-11
CS 233 & CS 341	Computer Architecture and System Programming	
OR		
CS 340	Introduction to Computer Systems	
& two CS courses at the 400 level above CS 403, excluding CS 421 and CS 491		
Choose one of the following:		3
STAT 200	Statistical Analysis	
STAT 212	Biostatistics	
CS 361	Probability & Statistics for Computer Science (recommended)	
CS 374	Introduction to Algorithms & Models of Computation	4
CS 421	Programming Languages & Compilers	3 or 4
Mathematics (may also fulfill the General Education QR I and II requirements)		
MATH 220	Calculus	5
or MATH 221	Calculus I	
MATH 225	Introductory Matrix Theory	2 or 3
or MATH 257	Linear Algebra with Computational Applications	
MATH 231	Calculus II	3
Required Geographic Information Science Coursework - Minimum of 24 hours		
GGIS 371	Spatial Analysis	
GGIS 379	Introduction to Geographic Information Systems	
GGIS 380	Geographic Information Systems II	
Two (2) additional GIS courses from the following list:		6
GGIS 205	Business Location Decisions	
GGIS 224	Environmental Data Science	
GGIS/SOC 280	Intro to Social Statistics	
GGIS 407	CyberGIS & Geospatial Data Science	
GGIS 412	Geospatial Technologies & Society	
GGIS/ATMS 421	Earth Systems Modeling	
GGIS/PATH 439	Health Applications of GIS	
GGIS 460	Aerial Photo Analysis	
GGIS 468		
GGIS 473	Digital Cartography & Map Design	
GGIS 476	Environmental Remote Sensing	
GGIS 477	Introduction to Remote Sensing	
GGIS 478	Techniques of Remote Sensing	
GGIS 479	Advanced Topics in GIS	
GGIS 480	Principles of Geographic Information Science	
GGIS 489	Programming for GIS	
Two (2) human and/or physical geography courses:		6
GGIS 204	Cities of the World	
GGIS 210	Social & Environmental Issues	
GGIS 221	Geographies of Global Conflict	
GGIS 222	Big Rivers of the World	
GGIS/NRES 287	Environment and Society	
GGIS/ESE 350	Sustainability and the City	
GGIS 370/ESE 320	Water Planet, Water Crisis	

GGIS 384	Population Geography
GGIS/NRES 401	Watershed Hydrology
GGIS 405	Geography Field Course
GGIS 406	Fluvial Geomorphology
GGIS 408	Humans and River Systems
GGIS 410	Green Development
GGIS 436/IB 439	Biogeography
GGIS 438	Geography of Health Care
GGIS 455	Geography of Sub-Saharan Africa
GGIS/LA 446	Sustainable Planning Seminar
GGIS 465	Transportation &Sustainability
GGIS 466	Environmental Policy
GGIS 471	Modern Geographic Thought
GGIS 482	Challenges of Sustainability
GGIS 483	Urban Geography
GGIS 496	Climate & Social Vulnerability

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Sample Sequence

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence.

Students must fulfill their Language Other Than English requirement by successfully completing a fourth level of a language other than English. See the corresponding section on the Degree and General Education Requirements page *(http://catalog.illinois.edu/general-information/degree-general-education-requirements/).*

First Year

First Semester	Hours	Second Semester	Hours
CS 100	1	CS 128	3
CS 124	3	CS 173	3
Free Elective course	1	MATH 220 or 221	5
Geographic Information Science course	3	Composition I or General Education course	4
Composition I or General Education course	4		
	12		**15**

Total Hours 27

Second Year

First Semester	Hours	Second Semester	Hours
CS 222	1	CS 233 or 340	4
CS 225	4	STAT 200, 212, or CS 361	3
MATH 225 or 257	2	MATH 231	3
Language Other than English (3rd level)	4	Language Other than English (4th level)	4
General Education course	3	General Education course	3
	14		**17**

Total Hours 31

Third Year

First Semester	Hours	Second Semester	Hours
CS 341 (or CS 400-level course)	4	CS 374	4
Human and/or Physical Geography course	3	CS 400-level course or Free Elective course	3
GGIS 371	4	Human and/or Physical Geography course	3
GGIS 379	4	General Education course	3
General Education course	3	General Education course	3
	18		**16**

Total Hours 34

Fourth Year

First Semester	Hours	Second Semester	Hours
CS 421	3	Geographic Information Science course	3
GGIS 380	4	General Education course	3
General Education course	3	General Education course	3
General Education course	3	Free Elective course	3
Free Elective course	2	Free Elective course	1
	15		**13**

Total Hours 28

Total Hours: 120

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Learning Outcomes

1. **Geographic Understanding**
   a. GGIS students will understand the interconnectedness of places and scales in human-environmental systems, including the sustainability of those systems.
2. **Spatial Patterns and Processes**

a. GGIS students will be able to analyze spatial patterns, distributions, processes, and connections within and among different human-environmental systems, using qualitative, quantitative, computational, and/or spatial methods of research appropriate to their level of training and their field of geographic inquiry.

3. **Problem-Solving and Communication**
   a. GGIS students will be able to formulate and conduct geographic analyses and communicate the results in verbal, written, and visual form.

Undergraduate Degree Programs in Geography & Geographic Information Science

For the Degree of Bachelor of Science in Liberal Arts and Sciences

- Major in Computer Science & Geography & GIS, BSLAS (p. 1)
- Major in Geography & Geographic Information Science, Geographic Information Science Concentration, BSLAS (http://catalog.illinois.edu/undergraduate/las/geography-geographic-information-science-bslas/geographic-information-science/)
- Major in Geography & Geographic Information Science, Physical Geography Concentration, BSLAS (http://catalog.illinois.edu/undergraduate/las/geography-geographic-information-science-bslas/physical-geography/)

For the Degree of Bachelor of Arts in Liberal Arts and Sciences

- Major in Geography & Geographic Information Science, General Geography Concentration, BALAS (http://catalog.illinois.edu/undergraduate/las/geography-geographic-information-science-balas/general-geography/)
- Major in Geography & Geographic Information Science, Human Geography Concentration, BALAS (http://catalog.illinois.edu/undergraduate/las/geography-geographic-information-science-balas/human-geography/)

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Department of Geography & Geographic Information Science

Geography & Geographic Information Science information: CS + GGIS (https://cs.illinois.edu/academics/undergraduate/degree-program-options/cs-x-degree-programs/computer-science-geography/)
Geography & GIS email: ggis-advisor@illinois.edu

College of Liberal Arts and Sciences (https://las.illinois.edu/)

Overview of college admissions & requirements: Liberal Arts & Sciences (http://catalog.illinois.edu/schools/las/academic-units/)

The Grainger College of Engineering (https://grainger.illinois.edu/)

Computer Science Degree information: CS + X Degrees (https://cs.illinois.edu/academics/undergraduate/degree-program-options/cs-x-degree-programs/#requirements)
Computer Science email: undergrad@cs.illinois.edu

Please consult with advisors in both Computer Science *and* Geography & GIS.