

COMPUTER SCIENCE + GEOGRAPHY (BS)

The CS+GEO BS brings together the two distinct fields of Computer Science and Geography in a multi-disciplinary degree program that reflects the wide use of Geographic Information Systems (GIS) technologies and the application of computational methods in geography and other social sciences.

The CS part of the CS+GEO BS curriculum provides students training in fundamental computational problem-solving skills including thinking abstractly, applying formal logic and mathematics, developing algorithms and data structures, and reasoning about and developing software systems at different levels of abstraction. The GEO part of the CS+GEO BS curriculum provides students training in Geographic Information Systems and digital mapping, spatial analytics, and spatial reasoning to explore phenomena, relationships, and processes that have spatial patterns and distributions. Students in the CS+GEO BS will have a unique multidisciplinary combination of critical intellectual, technical and creative skills that will set them apart.

The program provides students with a coherent and complete education in each field and prepares them to become:

- software developers with an exceptional expertise in GIS and other application areas of geography and, more broadly, the social sciences, as well as
- social scientists with expertise in geographic research methods who can leverage and develop technology-based solution to social science questions.

A CS+GEO BS graduate will be ideally suited for many positions requiring knowledge of geospatial technologies that refer to tools contributing to the geographic mapping and analysis of the environment and human societies, including GIS. Since the CS+GEO BS program incorporates the core of the CS BS degree program and the core of the GEO BA degree program, graduates of the program will also be well-prepared to pursue a graduate degree in either field.

Program Requirements	Quarter Hours
Liberal Studies	72
Modern Language	12
CS ICRS	48
GEO ICRS	44
Open Electives	16
Total hours required	192

Learning Outcomes

- Model a computational problem, select appropriate algorithms and data structures for a solution, justify the correctness of the algorithm, and implement an application solving the problem.
- Analyze and select an algorithm based on system effects.
- Analyze the efficiency of a computational solution mathematically, and validate the analysis experimentally.
- Criticize a program on the basis of its maintainability and suggest improvements.
- Use key concepts, theories, and vocabulary to interpret how socio-cultural, political, economic, and/or environmental phenomena may

construct a "space," a "place," a "landscape," a "location," or a "region" as a complex material or symbolic structure.

- Use qualitative and/or quantitative methodologies to analyze spatial phenomena, and collect, identify, and apply spatial data from either primary or secondary sources to interpret the spatial character of a physical, socio-cultural, or environment-society problem.
- Interpret spatial patterns of economic inequalities and social injustices and their relation to urban, built, and natural environments.
- Demonstrate competence in one or more of several geospatial technologies, (i.e. remote sensing, geographical information systems, global navigation satellite systems, etc.) and articulate effectively the results of that use in speech, text, image, or map.
- Describe and differentiate processes of globalization and their effects on cities, regions, physical systems, cultures, and political divisions.

Liberal Studies Requirements

Honors program requirements can be found in the individual Colleges & Schools section of the University Catalog. Select the appropriate college or school, followed by Undergraduate Academics and scroll down.

First Year Program		Hours
Chicago Quarter		
LSP 110 or LSP 111	DISCOVER CHICAGO or EXPLORE CHICAGO	4
Focal Point		
LSP 112	FOCAL POINT SEMINAR	4
Writing		
WRD 103	COMPOSITION AND RHETORIC I ¹	4
WRD 104	COMPOSITION AND RHETORIC II ¹	4
Quantitative Reasoning		
Not Required		
Sophomore Year		
Race, Power, and Resistance		
LSP 200	SEMINAR ON RACE, POWER, AND RESISTANCE	4
Junior Year		
Experiential Learning		
Required		4
Senior Year		
Capstone		
Required ¹		4

¹ Students must earn a C- or better in this course.

Learning Domains

Arts and Literature (AL) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/arts-and-literature/>)

- 3 Courses Required

Historical Inquiry (HI) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/historical-inquiry/>)

- 2 Course Required

Math and Computing (MC) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/math-and-computing/>)

- Not Required

Philosophical Inquiry (PI) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/philosophical-inquiry/>)

- 2 Courses Required

Religious Dimensions (RD) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/religious-dimensions/>)

- 2 Courses Required

Scientific Inquiry (SI) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/scientific-inquiry/>)

- 1 Course Required
[1 Lab Course]

Social, Cultural, and Behavioral Inquiry (SCBI) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/social-cultural-and-behavioral-inquiry/>)

- 1 Course Required

Major Requirements

Course	Title	Quarter Hours
The Modern Language Requirement (MLR)		12
All students will be required to demonstrate competence in a modern language (i.e., a language other than English) equivalent to the proficiency attained from one year of college-level language study. This Modern Language Requirement (MLR) may be demonstrated by:		
placing into 104 or above on the DePaul language placement exam		
completing the last course or earning AP or BI credit for the last course in the first-year collegel sequence of any language (e.g., 103 for DePaul language classes)		
completing a college course or earning AP or IB credit for a college course beyond the first-year level in any language (e.g., 104 or above for DePaul language classes)		
completing the final course of a four-year sequence of the same modern language in high school *		
completing a proctored exam by BYU and passing the exam (see the Department of Modern Languages website for registration details)		
completing a proctored Written Proficiency Test (WPT) by Language Testing International (LTI) and achieving a score of Beginner High or above (see the Department of Modern Languages website for registration details)		
*Students are strongly encouraged to take the DePaul language placement exam even if they have met the MLR via study of a language in high school. This will ensure continuation of language at the proper level.		
Please note: Modern Languages courses with an E-designation are taught in English and may not be applied to the Modern Langague Requirement.		

Students who complete an Inter-College Transfer (ICT) to the College will abide by the MLR in place on the effective date of the ICT, regardless of when they first matriculated at DePaul.

MAJOR REQUIREMENTS (CS ICRS)

MAT 140	DISCRETE MATHEMATICS I	4
MAT 141	DISCRETE MATHEMATICS II	4
CSC 241	INTRODUCTION TO COMPUTER SCIENCE I	4
CSC 242	INTRODUCTION TO COMPUTER SCIENCE II	4
CSC 300	DATA STRUCTURES I	4
CSC 301	DATA STRUCTURES II	4
CSC 321	DESIGN AND ANALYSIS OF ALGORITHMS	4
CSC 373	COMPUTER SYSTEMS I	4
CSC 374	COMPUTER SYSTEMS II	4
One course from the following		4
CSC 347	CONCEPTS OF PROGRAMMING LANGUAGES	
CSC 376	DISTRIBUTED SYSTEMS	
SE 350	OBJECT-ORIENTED SOFTWARE DEVELOPMENT	

Eight (8) additional crdit hours, can be any 300-level CSC, CSEC, DSC or SE 8

MAJOR REQUIREMENTS (GEO ICRS)

GEO 101	ENVIRONMENTAL GEOGRAPHY	4
GEO 103	URBANIZATION	4
GEO 241	GEOGRAPHIC INFORMATION SYSTEMS I: DIGITAL MAPPING	
GEO 299	KNOWLEDGE, PLACE AND POWER	4
GEO 391	STATISTICAL DATA ANALYSIS FOR GIS	4
Twenty-four (24) credit hours, at least four (4) of which must be 300-level, from the following:		24
GEO 133	URBAN GEOGRAPHY - EXPERIENTIAL LEARNING	
GEO 172	CULTURAL GEOGRAPHY: THE NATURE-CULTURE INTERFACE	
GEO 200	SUSTAINABLE URBAN DEVELOPMENT	
GEO 201	GEOPOLITICS	
GEO 204	RELIGIOUS GEOGRAPHY	
GEO 205	RACE, JUSTICE, AND THE URBAN ENVIRONMENT	
GEO 210	INTERNATIONAL ENVIRONMENTAL CONSERVATION	
GEO 211	BIOGEOGRAPHY	
GEO 215	INTERNATIONAL DEVELOPMENT AND REGIONAL INEQUALITY	
GEO 219	WOMEN AND SCIENCE	
GEO 220	OCEANOGRAPHY	
GEO 225	EARTH'S CHANGING CLIMATE	
GEO 231	HISTORICAL GEOGRAPHY OF CHICAGO	
GEO 233	COMPARATIVE URBANISM	
GEO 242	GEOGRAPHIC INFORMATION SYSTEMS II: COMMUNITY GIS	
GEO 243	EARTH OBSERVATION	
GEO 260	GLOBALIZATION AND RESOURCES	

GEO 266	WORLD ECONOMY: STATES, MARKETS AND LABOR	
GEO 269	CULTURAL AND POLITICAL ECOLOGY	
GEO 299	KNOWLEDGE, PLACE AND POWER	
GEO 310	GREEN INFRASTRUCTURE	
GEO 316	THE EUROPEAN UNION	
GEO 330	SUSTAINABLE URBAN TRANSPORTATION	
GEO 333	URBAN PLANNING	
GEO 334	URBAN/CITY DESIGN	
GEO 339	TOPICS IN ARCHITECTURE AND URBANISM	
GEO 340	PLACES, HUMANITIES AND GEOGRAPHIC INFORMATION SYSTEMS	
GEO 343	EARTH OBSERVATION II	
GEO 344	GEOGRAPHIC INFORMATION SYSTEMS III: SPATIAL ANALYSIS FOR SUSTAINABILITY	
GEO 346/446	GIS ANALYSIS OF ENVIRONMENTAL AND PUBLIC HEALTH	
GEO 347	WEB GIS AND SPATIAL DATA VISUALIZATION ON THE WEB	
GEO 348	SPATIAL DATA SCIENCE	
GEO 350	WORLD OF WINE	
GEO 351	GEOGRAPHY, FOOD AND JUSTICE	
GEO 395	SEMINAR IN SELECTED TOPICS	
Senior Capstone options - choose one course from the following:		4
CSC 394	SOFTWARE PROJECTS	
GEO 300	GEOGRAPHICAL INQUIRY	

Note: CSC 243 Python for Programmers and a CS elective can take the place of CSC 241 & CSC 242

Open Electives

Open elective credits are also required to meet the minimum graduation requirement of 192 quarter-credit hours.