

GEOGRAPHIC INFORMATION SCIENCE (BA OR BS)

Geographic Information Science (GIScience) is the scientific discipline that conducts spatial analysis to examine economic, environmental, physical, and social phenomena. The study of spatial data structures and computational techniques to capture, represent, process, and analyze geographic information are essential to GIScience. GIScience overlaps with and draws from many research fields such as computer science, statistics, mathematics, and psychology, and contributes to progress in those fields. GIScience also supports research in many academic disciplines such as natural resource management, environmental science and engineering, geosciences, agriculture, marine sciences, sociology, history, public health, business, and anthropology.

Courses in GIScience enable students to develop capability in spatial thinking and gather in-depth knowledge in geospatial technology. Geospatial technology is a term used to describe the range of modern tools contributing to the geographic mapping and analysis of the Earth and human societies, e.g. geographic information systems (GISystems), remote sensing, the global positioning system (GPS), spatial statistics, web mapping and navigation technologies.

According to the U.S. Department of Labor, graduates with skills in geospatial technology are in extremely high demand and are one of the highest growth areas in the federal government. Students have employment opportunities in many corporate and government entities. Students with an undergraduate degree in GIScience are also prepared to move on to graduate school to pursue M.A., M.S., and Ph.D. degrees in many fields that enable them to pursue academic jobs or to secure higher ranking positions in the public and private sectors.

Bachelor of Science or Bachelor of Arts

Students can obtain a B.S. or B.A. degree. The GIScience B.A. degree does not require students to take biology, chemistry, physics, or calculus, and focuses on classes related to spatial analysis of social issues. The GIScience B.S. degree requires students to take biology, chemistry, physics and calculus and is intended as preparation for students pursuing a career in natural science or engineering with geospatial technology.

Major Requirements

The major in GIScience requires at least 26 credits of 2000-level or higher courses in the Department of Geography. GIScience majors complete basic core courses before beginning advanced courses. Recommended preparation for the major: GEOG 1010 New Digital Worlds of Geographic Information Science and GEOG 1302 GIS Modeling of Environmental Change.

Required Core Courses

(at least 14 credits)

Course	Title	Credits
GEOG 2500	Introduction to Geographic Information Systems	4
GEOG 2505	Applications of Geographic Information Systems	3
GEOG 3510 or GEOG 3500Q	Cartographic Techniques Geographic Data Analysis	3

GEOG 3530	Introduction to GeoComputing	3
Any GEOG W course at the 2000 level or above (one or three credits)		1-3
Total Credits		14-16

Electives

In addition to the required courses above, the plan of study must include 12 credits of electives from courses below. At least six credits of electives must be selected from the list of GIScience courses. At least three of these GIScience elective credits must be 4000-level. The remaining electives may be chosen from any 2000+ class with GEOG designation. No more than six credits of internship and/or independent study (GEOG 4090 Internship in Geography: Field Study, GEOG 4091 Internship in Geography: Seminar, and GEOG 4099 Independent Study) may be counted toward the additional credit requirements of the Geographic Information Sciences major.

GIScience Courses

Course	Title	Credits
GEOG 3420	Field Methods in Geography	4
GEOG 3500Q	Geographic Data Analysis ¹	3
GEOG 3505	Remote Sensing of Marine Geography	3
GEOG 3510	Cartographic Techniques ¹	3
GEOG 3512	Introduction to Spatial Data Science	3
GEOG 4130		3
GEOG 4230	GIS and Remote Sensing for Geoscience Applications	3
GEOG 4515	Web GIS	3
GEOG 4516	Fundamentals of Spatial Database Systems	3
GEOG 4518	Mobile GIS	3
GEOG 4519	Spatial Big Data Analytics	3

¹ If it's not chosen as a core course.

Related Courses

12 credits of related coursework taken in other departments. The following is a list of pre-approved related courses that may be relevant to the GIScience major. Other courses can be used with approval of a student's Geography advisor.

Remote Sensing Courses

Course	Title	Credits
NRE 2000	Introduction to Geomatics	4
NRE 3535	Remote Sensing of the Environment	3
NRE 4535	Remote Sensing Image Processing	3
NRE 4575		4

Computer Science and Engineering Courses

Course	Title	Credits
CSE 2050	Data Structures and Object-Oriented Design	3
CSE 2102	Introduction to Software Engineering	3
CSE 2304		3
CSE 2500	Introduction to Discrete Systems	3
CSE 3000	Contemporary Issues in Computer Science and Engineering	1

CSE 3100	Systems Programming	3	URBN 2301Q	Research Methods and Analysis in Urban and Community Studies	3
CSE 3150	C++ Essentials	3	URBN 2302	Qualitative Methods in Urban and Community Studies	3
CSE 3300	Computer Networks and Data Communication	3	URBN 2400	City and Community in Film	3
CSE 3400	Introduction to Computer and Network Security	3	URBN 2998	Variable Topics	3
CSE 3500	Algorithms and Complexity	3	URBN 3210		3
CE 2251	Probability and Statistics in Civil and Environmental Engineering	3	URBN 3993	Foreign Study	1-6
CE 2310E	Environmental Engineering Fundamentals	3	URBN 3981	Internship in Urban Studies: Seminar	1-3
CE 2410	Introduction to Geospatial Analysis and Measurement	4	or URBN 3991	Internship in Urban Studies: Field Study	
CE 2710	Transportation Engineering and Planning	3	COMM 2000Q	Research Methods in Communication	3

Math and Statistics Courses

Course	Title	Credits
MATH 2110Q	Multivariable Calculus	4
MATH 2130Q		4
MATH 2143Q	Advanced Calculus III	4
MATH 2144Q	Advanced Calculus IV	4
MATH 2210Q	Applied Linear Algebra	3
MATH 2410Q	Elementary Differential Equations	3
MATH 2420Q		3
MATH 3160	Probability	3
MATH 3410	Differential Equations for Applications	3
MATH 3435	Partial Differential Equations	3
MATH 3710	Introduction to Mathematical Modeling	3
STAT 2215Q	Introduction to Statistics II	3
STAT 3025Q	Statistical Methods	3
STAT 3115Q	Analysis of Experiments	3
STAT 3375Q	Introduction to Mathematical Statistics I	3
STAT 3445	Introduction to Mathematical Statistics II	3
STAT 3515Q	Design of Experiments	3

Social Science Courses

Course	Title	Credits
ANTH 2510	Methods in Maritime Archaeology	3
ANTH 3003	Field Research in Social Settings	3
ANTH 3090	Directed Field Research in Anthropology	1-12
ANTH 3503	Old World Prehistory	3
ANTH 3512	African Archaeology	3
ANTH 3513	Near Eastern Prehistory	3
ANTH 3514	European Prehistory	3
ANTH 3515		3
INTD 3584	Seminar in Urban Problems	3
INTD 3594	Urban Semester Field Work Seminar	3
POLS 2062	Privacy in the Information Age	3
POLS 2072Q	Quantitative Analysis in Political Science	3
SOCI 3201	Methods of Social Research	3
SOCI 3211Q	Quantitative Methods in Social Research	4
URBN 2000	Introduction to Urban and Community Studies	3
URBN 2100	Survey Research Methods	3

URBN 2301Q	Research Methods and Analysis in Urban and Community Studies	3
URBN 2302	Qualitative Methods in Urban and Community Studies	3
URBN 2400	City and Community in Film	3
URBN 2998	Variable Topics	3
URBN 3210		3
URBN 3993	Foreign Study	1-6
URBN 3981	Internship in Urban Studies: Seminar	1-3
or URBN 3991	Internship in Urban Studies: Field Study	
COMM 2000Q	Research Methods in Communication	3
COMM 2110	Presenting in the Digital World	3
COMM 2300	Effects of Mass Media	3
COMM 2700	Fundamentals of Digital Production	3
WGSS 2124	Gender and Globalization	3
WGSS 2255	LGBTQ Sexualities, Activism, and Globalization	3
WGSS 2255W	LGBTQ Sexualities, Activism, and Globalization	3
WGSS 3255	Sexual Citizenship	3
WGSS 3255W	Sexual Citizenship	3
WGSS 3269	Gender, Sexuality, and Social Movements	3

Natural Science Courses

Course	Title	Credits
EEB 4100	Big Data Science for Biologists	4
EEB 4230W	Methods of Ecology	4
ERTH 2500	Earth System Science	3
ERTH 3230	Beaches and Coasts	3
ERTH 4050W	Geoscience and Society	3
ERTH 4210	Glacial Processes and Materials	3
ERTH 4735	Introduction to Ground Water Hydrology	4
MARN 3000E	The Oceans and Global Climate	3
MARN 3014	Marine Biology	3
MARN 3030	Coastal Pollution and Bioremediation	3
MARN 3812	Seminar in Marine Biodiversity and Conservation	3

Economics Courses

Course	Title	Credits
ECON 2201	Intermediate Microeconomic Theory	3
ECON 2202	Intermediate Macroeconomic Theory	3
ECON 2211Q	Quantitative Intermediate Microeconomics	3
ECON 2212Q	Quantitative Intermediate Macroeconomics	3
ECON 2301Q	Mathematical Economics	3
ECON 2311Q	Econometrics I	3
ECON 2312Q	Econometrics II	3
ECON 2326	Operations Research	3
ECON 2327	Information Technology for Economics	3
ECON 3103	Global Economic History: Deep Roots of Modern Societies	3
ECON 3313	Elementary Economic Forecasting	3
ECON 3421	International Trade	3
ECON 3439	Urban and Regional Economics	3

The Information Literacy Competency and Writing in the Major requirements can be satisfied by passing any 2000 or higher level W course in Geography.

University General Education Requirements

Every student must meet a set of core requirements to earn a baccalaureate degree, in addition to those required by the student's major course of study and other requirements set by the student's school or college. For more information about these requirements, please see General Education Requirements (<https://catalog.uconn.edu/undergraduate/gen-ed-requirements/>).

College of Liberal Arts and Sciences Degree Requirements

Students must meet a set of requirements established by the college in addition to the University's General Education requirements. For more information, see the College of Liberal Arts and Sciences (<https://catalog.uconn.edu/undergraduate/liberal-arts-sciences/#requirementstext>) section of this catalog.