GEOGRAPHIC INFORMATION SCIENCE

Department of Physics, Astronomy, GIS, Geology, and Environmental Science
Room 2023 Ward Beecher Hall
(330) 941-3616
Department Chairperson: Dr. Snjezana "Snow" Balaz (sbalaz@ysu.edu)
Administrative Specialist: Jill Mogg (jmmogg@ysu.edu)

GIS Faculty Contacts/Program Coordinators:
Dr. Bradley Shellito, Professor of GIS, bashellito@ysu.edu
Dr. Peter Kimosop, Associate Professor of GIS, pkimosop@ysu.edu

Welcome

The Geographic Information Science (GIS) program at Youngstown State University prepares students for varied career paths across multiple industries. GIS technology is a vital tool used extensively in both the public and private sectors.

GIS graduates find careers in state, local, and federal government agencies, nonprofits, and private companies—including those in the energy industry, regional and transportation planning, economic and community development, emergency management, and various branches of the U.S. military.

Why GIS?

GIS supports the operations and decision-making of businesses, nonprofits, and government agencies in several key ways, including:

Enhancing Financial Performance
Businesses use GIS, GPS, and remote sensing to identify economic trends and spatial patterns, enabling smarter decisions, improved logistics, and optimized resource allocation for greater efficiency and profitability.

Understanding Social Systems
GIS helps analyze how people interact within economic, political, and social systems, helping organizations tailor services, allocate resources, and make informed, population-focused decisions

Improving the Environment
GIS supports environmental efforts by analyzing climate trends, resources, and hazards, using tools like satellite imagery and drones to guide conservation and sustainable solutions.

Occupations

Students with GIS training may qualify for job postings such as:

·GIS Analyst: Analyzes spatial data, creates maps, and develops geospatial solutions across multiple industries. Job titles for this role may include GIS Business Analyst, Remote Sensing Analyst, Geospatial Intelligence Analyst, or GIS Crime Analyst.

·GIS Technician: Handles data input, modification, and processing to maintain geospatial data integrity and precision.

·GIS Developer: Builds and sustains GIS software, tools, and platforms.

·GIS Manager: Directs GIS initiatives, supervises teams, and allocates resources to optimize GIS functions.

·Urban Planner: Applies GIS expertise to urban development, transportation systems, and infrastructure planning.

·GIS Environmental Scientist: Uses GIS to interpret environmental information, evaluate ecological impacts, and promote sustainable practices.

·Cartographer: Employs GIS to design maps and other geographic representations.

·Geoscientist: Utilizes GIS to explore and analyze Earth's natural characteristics and phenomena.

·Forester: Integrates GIS in forest conservation, land assessment, and strategic planning.

·Surveyor: Leverages GIS technology for precise land measurement and mapping.

·Data Engineer: Incorporates GIS proficiency in data analytics, as spatial information plays an increasing role in visualization and decision-making.

·GIS Consultant: Offers specialized insights and recommendations on GIS strategies and implementations for businesses and organizations.

Median salaries for GIS professionals range from approximately $47,000 to $164,000, depending on the role, experience, and industry. Below are average salaries for some common GIS job titles.

GIS Technician – $47,174
CAD Technician – $59,821
Land Surveyor – $63,086
Cartographer – $71,885
CAD Engineer – $95,306
GIS Analyst – $96,346
GIS Consultant – $97,738
Geointelligence Analyst – $98,738
GIS Specialist – $98,738
LiDAR Analyst – $99,278
GIS Supervisor – $102,232
Sensing Analyst – $106,193
GIS Software Engineer – $127,254
GIS Program Manager – $164,070
Source: Lightcast, 2024

GIS and Location-Based Technologies
GIS products, particularly those from Environmental Systems Research Institute (ESRI), are widely used across sectors —supporting over 33,000 businesses, 12,000 national government agencies, 30,000 local governments, and 12,000 nonprofits.

Professor

Peter Kimosop, Ph.D., Associate Professor

Bradley A. Shellito, Ph.D., Professor

Majors

- BS in Geographic Information Science (https://catalog.ysu.edu/undergraduate/colleges-programs/college-science-technology-engineering-mathematics/department-geographic-information-science/bs-geographic-information-science/)
- BS in Geographic Information Science (online) (https://catalog.ysu.edu/undergraduate/colleges-programs/college-science-technology-engineering-mathematics/department-geographic-information-science/bs-geographic-information-science-online/)

Minor

- Minor in Geographic Information Science (https://catalog.ysu.edu/undergraduate/colleges-programs/college-science-technology-engineering-mathematics/department-geographic-information-science/minor-geographic-information-science/)

Certificate

- Certificate in Applied Geospatial Science and Technology (https://catalog.ysu.edu/undergraduate/colleges-programs/college-science-technology-engineering-mathematics/department-geographic-information-science/certificate-in-geospatial-science-and-technology/)

GIS 2610 Map Use and Interpretation 3 s.h.
The use of maps, aerial photography, and satellite imagery to depict physical and cultural landscapes. Topics include map elements and how to locate, read, and interpret maps and remotely-sensed imagery.
Prereq.: none.

GIS 2611 Geospatial Foundations 3 s.h.
An overview of geospatial science and technology, including introductory concepts in spatial analysis, Geographic Information Systems, remote sensing, and GPS. The class provides a survey of theoretical geospatial topics as well as their applications.
Gen Ed: Social and Behavioral Science.

GIS 2611H Honors Geospatial Foundations 3 s.h.
An overview of geospatial science and technology, including introductory concepts in spatial analysis, Geographic Information Systems, remote sensing, and GPS. The class provides a survey of theoretical geospatial topics as well as their applications in a computer lab setting.
Prereq.: none.
Gen Ed: Social and Behavioral Science.

GIS 3701 Introduction to Geographic Information Science 3 s.h.
Introduction to the principles of collection, storage, manipulation, retrieval, analysis and visualization of spatial data in a computer environment. Credit will not be given for GIS 3701 if a student has already received credit for GIS 5810.
Prereq.: GEOG 2611.
Prereq. or Coreq.: GIS 2611.

GIS 3702 Introduction to Remote Sensing 3 s.h.
Analysis and interpretation of earth features from both airborne and satellite observation platforms. Topics include photogrammetry, digital data manipulation, multispectral imagery analysis, and interpretation of environmental features. Credit will not be given for GIS 3702 if a student has already received credit for GIS 5805.
Prereq.: GEOG 2611.
Prereq. or Coreq.: GIS 2611.

GIS 3712 Thematic Map Design and Symbolization 3 s.h.
An introduction to cartographic design. Emphasis is on composition elements and the construction and perception of point, line, and area map symbols. The use of color, statistical techniques, and animated maps are also explored.
Prereq.: GEOG 2610 or GEOG 2611 or GEOG 2626 or GEOG 2640.

GIS 3781 Geographic Information Sciences Application for the Social Sciences 3 s.h.
Applications of Geographic Information Science (GIS) techniques for the social sciences in disciplines such as economics, sociology, anthropology, political science, and urban/cultural geography, as distinct from physical or environmental sciences. Focus is on the integration of a spatial perspective in social research, analysis and policy development and how GIS can be useful for collecting and analyzing both qualitative and quantitative data.
Prereq.: GIS 2611.

GIS 3782 GIS Applications for the Natural Sciences 3 s.h.
Applications of Geographic Information Science (GIS) techniques for the natural sciences in disciplines such as physical geography, geology, biology, ecology, natural hazards, environmental monitoring, planning and infrastructure, water resources, climate change, and energy. Topics range from spatial data quality, data conversion, database design, data management, analysis, and visualization.
Prereq.: GEOG 2611.
Prereq. or Coreq.: GIS 2611.

GIS 3783 Geographic Information Science Applications to Urban and Regional Studies 3 s.h.
The application of Geographic Information Systems (GIS) to issues involved in urban and regional studies, such as economic development, housing development and redevelopment, neighborhood rehabilitation, city planning, rural planning, zoning decisions, and transportation planning. The course is designed to provide planners and developers with an analytical skill set for collecting and analyzing both qualitative and quantitative spatial data. Two hours of lecture each week and two structured hours of lab each week.
Prereq.: GIS 2611.

GIS 4801 Advanced Geographic Information Science 3 s.h.
A continuation of Introduction to Geographic Information Science focusing on theory and application of advanced techniques in spatial data handling, GIS modeling, and spatial analysis. Credit will not be given for GEOG 4801 if a student has already received credit for GIS 5811.
Prereq.: GIS 3701.

GIS 4802 Advanced Remote Sensing 3 s.h.
Advanced digital image processing methods and algorithms. Themes include high-resolution multi-spectral imaging systems, SAR interferometry, and hyperspectral imaging systems, in addition to topics such as geometric corrections, atmospheric corrections, image enhancement, image segmentation and shape analysis and change detection. Designed to support graduate research efforts.
Prereq.: GIS 3702.

GIS 4840 Special Topics in GIS 3 s.h.
Selected aspects of GIS not covered in existing courses. Topic to be announced each time the course is offered. May be taken up to two times for credit if topic is not repeated.
Prereq.: 9 hours of GIS.

GIS 5812 GPS and GIS 3 s.h.
This course will introduce students to a series of topics involving the Global Positioning System (GPS) in conjunction withGeographic Information Systems (GIS).
Prereq.: GIS 3701.

GIS 5820 Directed Research in GIS 1-3 s.h.
An in-depth study of a specific problem in GIS. The problem is dependent upon the student's interest and competence, availability of faculty supervision and department equipment. May be repeated up to 3 semester hours.
Prereq.: 20 semester hours of GIS.

GIS 6901 Introduction to Geographic Information Science 3 s.h.
Introduction to the principles of collection, storage, manipulation, retrieval, analysis and visualization of spatial data in a computer environment. Designed to support graduate research efforts. No credit if taken GIS 5810.
Prereq.: permission of instructor.

GIS 6902 Introduction to Remote Sensing 3 s.h.
Analysis and interpretation of earth features from both airborne and satellite observation platforms. Themes include photogrammetry, digital data manipulation, multispectral imagery, and interpretation of environmental features. Designed to support graduate research efforts. No credit if taken GIS 5805.
Prereq.: permission of instructor.

GIS 6903 Advanced Geographic Information Science 3 s.h.
Focus is on theory and application of advanced techniques in spatial data handling, modeling, and spatial analysis. Designed to support graduate research efforts.
Prereq.: GIS 6901.

GIS 6904 Advanced Remote Sensing 3 s.h.
Advanced digital image processing methods and algorithms. Themes include high-resolution multi-spectral imaging systems, SAR interferometry, and hyperspectral imaging systems, in addition to topics such as geometric corrections, atmospheric corrections, image enhancement, image segmentation and shape analysis and change detection.
Prereq.: GIS 6902.