

GEOGRAPHY AND GEOSPATIAL ANALYSIS (GEOG)

Geographers study places, natural and human-altered landscapes, and processes by which people make their livelihood and give their lives meaning, and in so doing, create and modify their environments. Geospatial analysis builds on the traditional tools of geography by applying specialized software to facilitate combination of data, maps, aerial and satellite images, and to analyze landscape processes and change over time, at multiple scales, and with attention to features not always visible from the ground.

The Geography and Geospatial Analysis minor provides a foundation in human geography and the fundamental skills and methods of the growing field of geospatial analysis, and complements studies in many other disciplines including Anthropology, Biology, Business Administration, Economics, English, Environment and Sustainability, Geology, History, Politics and Government, Psychology, and Sociology.

Program Goals

- Students will be creative, ethical, globally-concerned, geospatial problem solvers.
- Students will be effective geospatial communicators.
- Students will be well-prepared for future studies and careers.
- Geographic Information Systems (GIS) Certificate (<https://catalog.western.edu/undergraduate/programs/geography/geographic-information-systems-certificate/>)
- Geography and Geospatial Analysis Minor (<https://catalog.western.edu/undergraduate/programs/geography/geography-geospatial-analysis-minor/>)

Geography Courses

GEOG 110. World Regional Geography (GT-SS2). (3 Credits)

A survey of the major regions of the contemporary world-defined according to a combination of biophysical, cartographic, cultural, religious, linguistic, political, and economic criteria. Emphasis is given to understanding regional characteristics and processes, and to relationships between events and processes occurring in different regions. Current events of major importance are incorporated where appropriate. GT-SS2

GEOG 120. Introduction to Human Geography (GT-SS2). (3 Credits)

A thematic study of cultural landscapes and the processes by which people create and modify them. Topics of discussion range from ancient to modern, rural to urban, local to international, and include themes as diverse as the origins and spread of agriculture, migration and immigration, urban morphologies and social interactions, ethnicity, development and underdevelopment, and environmental concerns. GT-SS2

GEOG 197. Special Topics. (1-6 Credits)

GEOG 222. Our Digital Earth. (3 Credits)

Using primarily on-line data and sources of maps, aerial photographs and satellite images, students develop and apply understanding of basic principles and techniques of map interpretation, communication with maps, and the appropriate use and interpretation of aerial photographs and satellite images. The course emphasizes both the skilled use of these standard tools of geographic analysis and visualization and communication of data and analysis with free on-line mapping tools and location-enabled mobile phone applications.

GEOG 250. Geography of North America (GT-SS2). (3 Credits)

A survey of the major biophysical, cultural, and economic regions of the United States and Canada. Major themes of human geography including demography, migration, land use change, and ecological concerns are addressed in appropriate regional contexts. Prerequisite: GEOG 120 or sophomore standing, or instructor permission. GT-SS2

GEOG 292. Independent Study. (1-6 Credits)

GEOG 297. Special Topics. (1-6 Credits)

GEOG 340. Intro Geographic Info Systems. (3 Credits)

An introduction to the foundations, concepts and applications of Geographic Information Systems (GIS), including cartographic communication, data compilation, creation, and quality assessment, and vector data analysis methods. These topics are explored with attention to making better and more equitable policy and decisions informed by spatial analysis. Prerequisite: minimum sophomore standing or instructor permission. GEOG 222 recommended.

GEOG 351. Geography of Latin America and the Caribbean. (3 Credits)

A thematic study of the physiographic and cultural regions of Latin America and the major historical and contemporary geographic processes that characterize the region. Major topics of discussion include climate and physiography, environmental concerns and human rights, the nature of Latin American cities, pre-Hispanic and modern agriculture, and the nature of contemporary economic processes in the region. Prerequisite: GEOG 120 or sophomore standing or instructor permission.

GEOG 371. UAV Imagery Acquisition. (1 Credit)

An overview of the concepts and processes entailed in planning, obtaining permission for, and implementing an automated flight mission for acquisition of aerial images while following FAA Part 107 regulations. Students will plan and implement a short photography mission, process, and analyze the resulting air photos. Prerequisite: GEOG 340 or instructor permission.

GEOG 372. Satellite Remote Sensing. (2 Credits)

An overview of the concepts and processes entailed in the acquisition, processing, distribution, use and analytical interpretation of digital images obtained by satellite remote sensing. Students will learn to select appropriate images from the USGS Landsat and Sentinel imagery archives, process them for analysis, and implement techniques such as supervised and unsupervised classification, feature detection, change detection, mineral characterization, vegetation health, and fire severity analysis. Prerequisite: GEOG 340 or instructor permission.

GEOG 375. Web GIS. (1 Credit)

An overview of the concepts and processes entailed in the acquisition and processing of publicly available online, and field collected data, and the principles of good cartography applied to online maps and mapping. A major focus of the course is the incorporation of real-time, and crowd-sourced data into web sites, and aspects of cartography unique to the online format. Students will map issues and data of their own choice and interest and prepare maps for publication in online Story Maps and webpages. Prerequisite: GEOG 222 or instructor permission.

GEOG 392. Special Topics. (1-6 Credits)

An opportunity for detailed study and/or research by advanced students. Prerequisites: GEOG 110 and GEOG 120; or instructor permission.

GEOG 397. Special Topics. (1-6 Credits)

GEOG 460. Geospatial Analysis. (3 Credits)

Students enhance their understanding of concepts, skills, and techniques learned in an earlier GIS course by applying additional training in advanced vector and raster analysis, utilization of satellite imagery, and geospatial analysis methods to inform analysis of landscape change processes such as wildfire, deforestation, urbanization, reforestation, drought, flooding, climate change, and agricultural intensification.

Prerequisite: GEOG 340 or instructor permission.

GEOG 482. Advanced Applications in GIS. (2 Credits)

Either an overview of a set of skills involving geospatial analysis with scripted automation tools such as R, Google Earth Engine, and ArcPython or a project-based application of advanced geospatial analysis techniques focused on a topic or realm of investigation and expertise of the faculty teaching the course. Prerequisite: GEOG 460, or instructor permission.

GEOG 492. Geography Independent Study. (1-6 Credits)

GEOG 497. Special Topics. (1-6 Credits)

GEOG 499. Internship in Geography. (1-3 Credits)

Provides the opportunity for advanced students to apply skills and knowledge gained from course work to an applied setting typical of those in which geographers are employed. Prerequisite: junior standing and completion of all other geography requirements; or instructor permission.