

GEOGRAPHIC INFORMATION SCIENCE

GIS 101 Introduction to GIS 4 Credits

Geographic Information Science and Technology (GIS&T) is a multidisciplinary field focused on the theories, methodologies, and tools for collecting, analyzing, and visualizing spatial data. It has applications in environmental science, urban planning, disaster management, public health, agriculture, transportation, real estate, utilities, telecommunications, sociology, archaeology, and geography. Professionals in academia, business, and government use GIS&T to manage and analyze extensive spatial datasets, enabling real-time navigation, optimizing routing, facilitating safe navigation for self-driving cars, tracking wildlife migration, constructing 3D urban models, and providing insights for anthropological studies and traffic safety. This course covers fundamental GIS concepts, data input, models, spatial analysis, and data output, balancing theory with hands-on lab exercises and student-led projects. Students gain practical experience with ArcGIS Pro, a popular GIS software technology. By completing this introductory course, students will build core competencies, understand basic GIS concepts, technical issues, and applications; learn how GIS contributes to their academic studies and its unique importance; know the issues involved in obtaining, evaluating, implementing, and managing GIS data and projects; understand the technical language of GIS; and gain practical experience using ArcGIS Pro.

Cross-listed as: ANT 109/ENV 109

Term(s) Offered: Fall, All Years

GIS 200 Spatial Analysis and Modeling 4 Credits

This intermediate-level course advances the knowledge and technical skills developed in GIS 101, emphasizing analytical methods and modeling techniques used in geographic information science. Students learn to investigate spatial relationships, model geographic processes, and apply quantitative and qualitative tools to solve complex spatial problems. Major topics include spatial statistics for pattern analysis, surface and terrain modeling for physical landscape assessment, network analysis for transportation and logistics optimization, and site-suitability modeling for resource allocation and spatial decision-making. The course integrates conceptual understanding with applied practice through laboratory exercises, projects, and case studies that reflect professional and research applications of GIS. Students will use ArcGIS Pro and complementary analytical software to construct and evaluate spatial models, analyze multidimensional datasets, and communicate findings through cartographic and statistical outputs. Emphasis is placed on methodological rigor, critical interpretation of results, and the ethical use of spatial data in decision contexts.

Requisites: Pre-req: GIS 101

Cross-listed as: ANT 109/ENV 109

Term(s) Offered: Spring, All Years