GIS AND SPATIAL ANALYSIS, CAS

The 12-credit Certificate in Advanced Studies (CAS) in GIS and Spatial Analysis is designed for graduate students who want to use Geographic Information Systems (GIS) and spatial data analysis in their academic or professional careers. The CAS offers students theoretical and hands-on technical training in the applications of spatial information technologies and analysis in the social, natural, health, and data sciences. The CAS is appropriate for graduate students in fields such as earth sciences, biology, geography, sociology, engineering, public policy, data science, the humanities, public health, and education who want to complement their primary area of study with expertise in GIS mapping and spatial data analysis.

Spatial data analysis, modeling, and visualization aid decision-makers in the public, private and nonprofit sectors every day. Careers in urban, regional, and transportation planning, environmental resource management, health-care delivery, and public administration leverage tools such as GIS, GPS (global positioning systems), unmanned aerial vehicles, remote sensing technologies, and image analysis to make geographically informed decisions.

The 12-credit CAS in GIS and Spatial Analysis offers courses in three recommended tracks for students interested in

1. the natural sciences,
2. the social and health sciences, or
3. data science and data visualization.

After completing the foundational required course (GEO 683 Geographic Information Systems (3 credits)), students should choose three additional courses (9 credits). Interested students should contact the CAS Director to enroll and select appropriate courses.

Student Learning Outcomes

1. Explain the concepts and principles of spatial data and geospatial technologies
2. Apply geographic information technologies to interdisciplinary research questions and real-world problems
3. Create, locate, evaluate, manipulate, analyze, integrate, visualize, and share spatial data
4. Articulate and apply ethical approaches to spatial analysis and map making
5. Analyze and model geographic patterns and relationships using geospatial technologies
6. Create maps and visualizations to meaningfully communicate geographic phenomena with wider audiences

Program Requirements

Code	Title	Credits
Required Course		
GEO 683	Geographic Information Systems	3-4
Additional Courses		
Select 9 credits from the following:		9
EAR 610	Applications of GIS in the Earth Sciences	
GEO 583	Environmental Geographical Information Science	
GEO 676	Advanced GIS Analysis and Applications	
GEO 678	Spatial Storytelling	
GEO 679	Introduction to Unmanned Aerial Vehicles: Research & Applications	
GEO 681	Cartographic Design	
GEO 682	Environmental Remote Sensing	
GEO 684	GIS for Urban Environments	
GEO 686	Quantitative Geographic Analysis	
GEO 687	Environmental Geostatistics	
GEO 688	Geographic Information and Society	
GEO 758	GIS-based Geostatistical Methods and Applications	
GEO 781	Seminar: Cartography	
PHP 633	Spatial statistics for public health	
Total Credits		**12-13**