

Geographic Information Systems Certificate

Geographic Information Systems study geospatial phenomena using concepts, techniques, tools, and data associated with georeferenced information, remote sensing, data visualization, global positioning systems, and spatial analysis. Over the last few decades, these theories and technologies have gained prominence in geography and are revolutionizing methods in associated fields of research including the environmental, health, social, behavioral, and biophysical sciences, as well as the operations of municipal organizations, business, industry, government, and nonprofit organizations. Students earning a GISC will be highly educated graduates who can use geospatial technologies and data analysis techniques to anticipate and respond effectively to challenges and solve complex problems. They will be able to apply their geospatial education to anticipate uncertainties, solve complex problems, and respond effectively to challenges with confidence and reasoned judgment.

At the completion of the certificate program, a student should be able to:

- Demonstrate an understanding of fundamental concepts and practices of GIS and advances in Geospatial Information Science and Technology (GIST).
- Apply GIS analyses to geospatial problems and research questions.
- Demonstrate proficiency in the use of GIS tools to create maps and other geospatial products that are designed-for-purpose and effectively convey information.
- Apply basic geovisualization concepts such as color theory, symbolization, and map design to enable analyses of problems with a geospatial component.
- Gather and process original data using a Global Positioning System (GPS) and demonstrate proficiency in theory and application of different referencing methods.
- Demonstrate organizational skills in spatial data and project management.
- Demonstrate confidence in undertaking new analyses using GIS and troubleshoot problems in GIS.
- Apply modeling, mathematical concepts, and statistical methods to the analysis of complex geospatial problems in a variety of professional settings.

Program Notes

- Students who have successfully completed GEV 4700 at Villanova University or at an equivalent course at another institution (after review by the GISC Program Coordinator) will have the requirement for GEV 7040 waived in place of an additional 4 credits of electives. Students who have substantial professional experience with GIS will be interviewed by the GISC Program Coordinator and will, at the Program Coordinator's discretion, likewise have the requirement for GEV 7040 waived in place for elective credits.
- Students enrolled in the MSES program may count courses completed as part of their MS degree towards the GISC.
- Students will complete the 0-credit GEV 9003 GIS Portfolio course in their final semester, which entails the development and presentation of a portfolio of work completed during the GISC program.

Program: Environmental Science

Type: Graduate Certificate

Required Courses

8 credits

Item #	Title	Credits
GEV 7040	Intro to GIS	4
GEV 7041	GIS for Environmental Systems	4
GEV 9003	GIS Portfolio	0

Elective Courses

6 credits

Item #	Title	Credits
GEV 7042	Advanced Geospatial Applications in Environmental Science	3
GEV 7100	Remote Sensing-Env Analysis	3
GEV 7201	Spatial Analysis of Env Syst	3
GEV 7202	Geo Statistics	3
GEV 7203	Env Model w GIS & Remote Sense	3
GEV 7204	Geospatial Project Mgmt	3
GEV 8003	Speical Topics in Env Sustain	3
GEV 8320	Adv Topics in Env Lab SC II	4