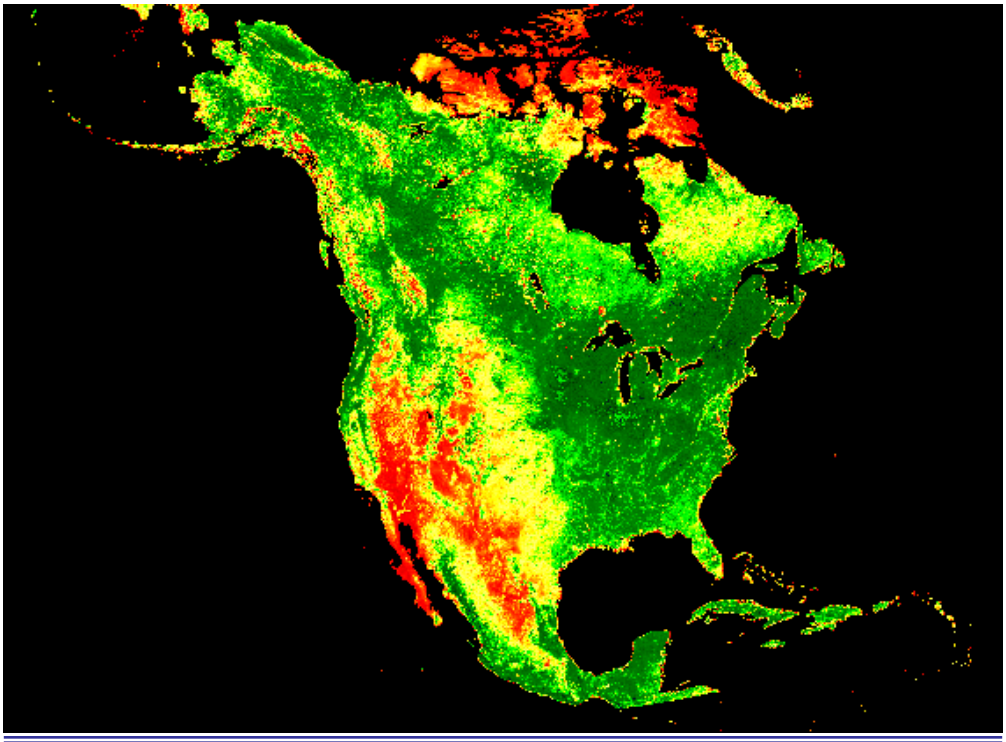


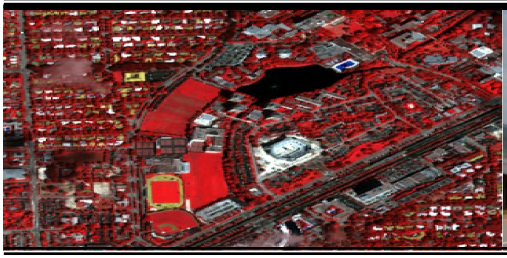
CERTIFICATE PROGRAM IN GEOSPATIAL TECHNOLOGY

UNIVERSITY OF MIAMI

Department of Geography and Regional Studies

PROGRAM DESCRIPTION

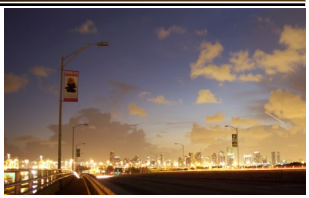
This Certificate Program is designed to benefit students who seek to enhance their skills in geospatial technologies, especially Geographic Information Systems (GIS) and satellite remote sensing. Students will be exposed to standard software tools used in the industry including ArcGIS, ERDAS IMAGINE, and Idrisi, as well as image data from a range of optical and microwave orbiting satellites. A full suite of geospatial software is available in the Department of Geography and Regional Studies (GEG) GIS lab at the University of Miami. Students who earn the Certificate will enhance their employment prospects and/or advance their careers in geospatial technology, particularly in job settings that stress the use of satellite remote sensing and vector-based GIS.



GEOSPATIAL TECHNOLOGY

What is Geospatial Technology?

Geospatial technology involves a suite of computer-based approaches to manage relational databases, digital maps, data from global position systems, and overhead imagery to organize, display, and analyze spatial attribute data related to the environment, business, planning, health care, homeland security and infrastructure.

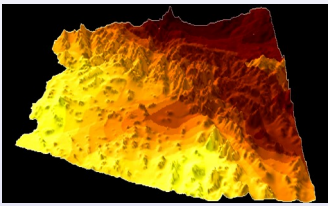


Who uses Geospatial Technology?

Geospatial technology is used extensively in the US Federal Government, the private sector, and international institutions such as United Nations and the World Bank. Geospatial technology is also used in developing countries to optimize scarce resources for environmental management. Private voluntary and non-governmental institutions that work on humanitarian and environmental issues have also developed significant capabilities in the use of this technology.

Applications of Geospatial Technology

All issues that involve monitoring of the earth's surface or near surface environment or processes, or involve exploitation of the earth's resources can benefit from geospatial technology. Some examples are available on our web sites: www.geography.miami.edu and www.geodesy.miami.edu.



Jobs in Geospatial Technology

Many employers are looking for people who have these skills. Starting salaries typically range from $50-80K in the public sector (e.g., working for local governments) for experienced GIS analysts. Increasing numbers of job search engines (e.g., GIScafe, GISjobs, GIS Jobs Clearinghouse, etc.) post opportunities for geospatial professionals.

REQUIREMENTS

The Certificate requires a minimum of 15 credits, including three core courses and two or more electives completed with at least a C grade in each course. Students may also receive up to 6 credits toward the certificate for past course work completed at UM or other accredited colleges and universities within the past 3 years.

Core Courses

- **Introduction to GIS (GEG 199) -** Conceptual overview of GIS technology, introducing key elements such as projection systems, datums, data models, and analytical methods such as overlays.
- **Intermediate GIS (GEG 391) -** Review of coordinate and projection systems used to relate satellite and image data to standard coordinate systems Advanced concepts of analysis, data storage, data development (digitization, topology, error correction) and manipulation, including suitability mapping, cartographic modeling, and decision support.
- **Environmental Remote Sensing (GEG 392) -** Survey of satellite imaging technologies and basic image processing techniques. Special emphasis is paid to optical and SAR satellite imagery for land cover applications.

Electives

- **Cartographic Design (GEG 280) -** Building upon the knowledge skills acquired in GEG 199, students learn the basics of map making and design, including interactive maps, visualizations, and 3-D representation of land and cityscapes.
- **Introduction to Microwave Imaging and Synthetic Aperture Radar (GEG 410) -** Basic microwave theory, including generation of microwaves, transmission of microwave energy through the atmosphere, interaction of microwaves with the ground surface and man-made objects, and design of microwave reception systems, including radiometers, altimeters, scatterometers and SAR.
- **Introduction to Quantitative Methods (GEG 481 or GEG 580) -** Basic descriptive statistics, including spatial statistics. Probability, hypothesis testing, correlation, and regression.
- **GIS and Environmental Modeling (GEG 491) -** Mathematical and statistical functions applied to GIS data to model environmental processes such as urbanization and land-change modeling.
- **Independent Study (GEG 525)** - Provides an opportunity to study an academic topic not otherwise available through the regular course offerings.
- **Internship (GEG 535) -** Internships with local organizations including city governments as well as private organizations to help students gain much needed practical experience.
- **Advanced Quantitative Methods (GEG 582) -** Continuation of GEG 481. The use of statistical methods and techniques in the solution of geographic research problems. Prerequisite: GEG 481.
- **Introduction to GIS for Graduate Students (GEG 591) -** An overview of GIS concepts and databases; emphasizes individual student projects to advance graduate-level research skills.

Courses offered under Special Topics in Geography (GEG 545)

- **Web-GIS -** Introduces map serving technologies and internet map design. Lab exercises emphasize use of ArcIMS and ArcSDE. Students build their own on-line interactive, customizable maps and will learn the basics of Client/Server architecture and processing, JavaScript programming, and XML/HTML basics.
- **Advanced SAR Techniques and Applications -** This course builds on material covered in GEG 410. . The course will review advanced SAR processing, including optimal processing for high spatial resolution ("super-resolution"), use of polarization, and basic and advanced image forming techniques, such as range-Doppler, omega-K, and back-projection. Phase exploitation technicques such as interferometry and coherence change will be emphasized.
- **Advanced Spatial Statistics -** Social and environmental science applications of spatial statistical analysis illustrated with data and numerical (simulation experiments) examples employing interactive software. This course's focus is on spatial autocorrelation.
- **GIS in Public Health -** Builds general knowledge of spatial applications in the field of public health and epidemiology and provides hands-on experience using GIS. Exposure to current public health research and scholarly publications investigating spatial patterns of health outcomes.

ADMISSION REQUIREMENTS

Students not already enrolled at the University of Miami are expected to have an undergraduate GPA of 2.5 or higher and either an SAT or GRE score of 1,000 or higher. International Students must meet Admissions Office and Homeland Security requirements.

- Non-UM students should contact Dr. Sen Roy (ssr@miami.edu) before applying. •

AFFILIATED FACULTY

Falk Amelung (Ph.D. 1996, Strasbourg, France) Associate Professor of Geophysics. His general research interest is the deformation of the Earth's crust by tectonic and volcanic processes. He is particularly interested in using data derived from satellite radar interferometry and he teaches graduate classes on radar interferometry, geophysical inverse theory, and crustal deformation processes.

Douglas O. Fuller (Ph.D. 1994, University of Maryland) Associate Professor of Geography. Dr. Fuller specializes in optical remote sensing, geographic information systems (GIS), land-cover change, and human-environment interactions mainly in tropical areas. He uses imagery from weather and other satellites to examine climatic change, natural hazards, patterns of biodiversity, and habitat loss.

J. Miguel Kanai (Ph.D. 2008, UCLA) Assistant Professor of Geography. Dr. Kanai's research explores how intertwined processes of urbanization and globalization shape contemporary social life. With a focus on the territorial politics of redevelopment in globalized cities, his work engages postcolonial urban theory, the spatiality of inequality, as well as regional, city, and neighborhood planning, and the place of the middle classes in the contemporary city.

Shouraseni Sen Roy (Ph.D. 2005, Arizona State University) Assistant Professor of Geography. Dr. Sen Roy conducts research in climatology and specializes in the monsoonal rainfall patterns of the Indian subcontinent. Her specialty also includes geographic information systems, spatial analysis, and interpolation of meteorological data. She uses advanced spatial analysis techniques to examine long term patterns of different climate phenomena.

Ira M. Sheskin (Ph.D. 1977, Ohio State University) Professor of Geography and Director of the Jewish Demography Project of the Sue and Leonard Miller Center for Contemporary Judaic Studies. Dr. Sheskin is a human geographer with teaching and research interests in ethnic geography, the Middle East, quantitative methods, and urban geography.

Shimon Wdowinski (Ph.D. 1990, Harvard University) Associate Research Professor of Geophysics. Dr. Wdowinski specializes in space geodesy (GPS and Interferometric SAR), remote sensing, tectonics, hydrology, and numerical modeling. He uses GPS, SAR, and InSAR observations to detect very precisely small movements of the Earth's surface to study earthquakes, urban subsidence, wetland surface water flow, and vegetation structure of forests.

For More Information Please Contact:
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