GEOGRAPHIC INFORMATION SCIENCE (GIS)

GIS 308 Geovisualization and Cartography (3)
Prerequisite(s): GY 307.
An examination of the design and implementation of effective visualization of geographic data. The theoretical basis of cartography, visual perception and communication models, the creation, analysis, and interactive and interactive mapping techniques. Geovisualization offers new perspectives on digital principles of GIS and ways to work with public and private stakeholders. Topics include cartographic principles, mapping techniques, and multivariate mapping.

GIS 406 Advanced Remote Sensing (3)
Prerequisite(s): GY 302.
Advanced techniques, data collection, and analytical methods using various types of remotely sensed data. These will include LiDAR data, Ground Penetrating Radar, and various types of multi-spectral data from satellites such as Landsat, Quickbird, Ikonos, SPOT, and others. Multi-spectral data will include: thermal, natural color (RBG), near to far-infared and others. This course will use various methodologies for collection, classification (supervised ad unsupervised), and analysis of digital data to accomplish change detection, Normalized difference Vegetation Index (NVD1), land use-land cover (LULC), etc.

GIS 408 Drone Piloting and Mapping (3)
Prerequisite(s): GY 307.
This course will teach students the FAA rules regulations with drone aircraft piloting and associated mapping techniques. Students will examine remotely sensed images from various angles, scales, platforms, resolutions, and wavelengths for the purpose of identifying objects, judging their significance.

GIS 419 Geospatial Programming (3)
This course explores the use of scripting languages, such as Python and R, to create applications that perform fundamental spatial statistical analysis, such as geoprocessing, spatial autocorrelation, database management, spatial regression, and map creation. Students will explore data analysis and data modeling. Students will demonstrate knowledge of programming concepts and approaches and develop solutions to problems by automating geoprocessing tasks. The student will provide their code and data in an open-source platform for reproducibility.

GIS 420 Web-based GIS: Technologies and Applications (3)
This course introduces students to the growing field of web-based GIS. The course focuses on the design, development, and implementation of web mapping applications, allowing students to apply techniques in real-world applications. Students taking this course will be required to develop a web GIS application.

GIS 451 Applied Geographical Information Systems (3)
Prerequisite(s): GY 307.
Training in advanced Geographic Information Systems (GIS) techniques using spatial data collection, project design, geospatial modeling, data management, and implementation. This course examines the use of GIS to solve real-world spatial problems. This course will require a project to be designed and implemented by the student with pre-approval of instructor.

GIS 456 Spatial Data, Layout, and Design (3)
Prerequisite(s): GIS 451.
This course introduces students to the fundamentals of map composition, map layout and design, chart creation, and data classification. The student should be able to produce aesthetically accurate and meaningful maps, charts, and cartograms to display and define results of spatial analytics. The project must incorporate design principles, cartographic layout, or a unique approach to Geo-visualization.

GIS 459 Spatial Data Collection and Management (3)
This course covers multiple methods of capturing data, acquiring and importing existing spatial data (both raster and vector) into geographic information systems, and deriving spatial information from these data. It also includes manipulating and managing spatial data from various platforms, devices, and sources. The student may be asked to develop a project using various data types (vector, raster, LiDAR, etc.).