GEOMATICS

GIS 6103 GIS Programming and Customization 3 Credits
Grading Scheme: Letter Grade
Hands-on introduction to the capabilities of a Geographic Information System (GIS) to be expanded through programming.
Prerequisite: No pre-requisites.

GIS 6116 Geographic Information Systems Analysis 3 Credits
Grading Scheme: Letter Grade
Analytical tools such as software grid modules, database query, map algebra, and distance operators; analytical operations such as database query, derivative mapping, and process modeling; sources and nature of uncertainty and error, and project planning management.
Prerequisite: SUR 3393 and SUR 3393L

SUR 5365 Digital Mapping 3 Credits
Grading Scheme: Letter Grade
Methods of digital representation of maps, coordinate development, digitizing, stereocompilation, scanning, remote sensing, hardware and software systems, file conversion, integration into GIS systems, and attribute development.
Prerequisite: consent of instructor.

SUR 5385 Remote Sensing Applications 3 Credits
Grading Scheme: Letter Grade
Review of remote sensing systems, image classification methods, mapping applications, integration of remotely sensed data into GIS systems, application of data for variety of land information systems.
Prerequisite: consent of instructor.

SUR 5386 Image Processing for Remote Sensing 3 Credits
Grading Scheme: Letter Grade
Analyzing remote sensing imagery with natural resource applications: image formation and radiometric/atmospheric correction models; hyperspectral image formation; dimensionality reduction and classification; machine learning classification algorithms; and analysis of Light Detection and Ranging (LiDAR) data.

SUR 5525 Least Squares Adjustment Computations 3 Credits
Grading Scheme: Letter Grade
Implementation of least squares solutions for survey-mapping and GIS applications, time and storage optimization; error analysis; initial approximation generation; robust estimations; and computer programming.
Prerequisite: proficiency in computer language and consent of instructor.

SUR 6346 Marine Geomatics 3 Credits
Grading Scheme: Letter Grade
An exploration of the technologies, concepts, and methods required to acquire, analyze, and manage geographic data used in seafloor mapping and imaging. Background on the capabilities and limitations of different data collection systems will be provided, as well as for the other types of sensors necessary to collect accurate information. Topics will include marine positioning, underwater acoustics, sonars, hydrographic standards, multibeam echosounder systems and hydrographic survey design.

SUR 6355 Analytical Photogrammetry 3 Credits
Grading Scheme: Letter Grade
This course relates the principles of precise measurement and proper data reduction through measurements of photographs followed by calculations to determine spatial information.

SUR 6377 Geospatial Application of UASs 3 Credits
Grading Scheme: Letter Grade
Covers contemporary issues and common applications associated with small UASs (Unmanned Aerial Systems).

SUR 6395 Topics in Geographic Information Systems 3 Credits
Grading Scheme: Letter Grade
Database development, economic impact of GIS, development of standards, integration of data sets, hardware and software developments, and advances in GIS technology.
Prerequisite: consent of instructor.

SUR 6502C Foundations of UAS Mapping 3 Credits
Grading Scheme: Letter Grade
Covers the fundamental components of small unmanned aerial systems (UASs) and how they are used to produce high resolution, spatially accurate, planimetric maps and 3-D models of the terrain.

SUR 6535 GPS-INS Integration 3 Credits
Grading Scheme: Letter Grade
Principles of inertial navigation and its integration with GPS; coordinate frames, modeling linear motion and rotational motion, mechanization of inertial navigation sensor measurements, space state representation of system errors and linear state equations.
Prerequisite: Background in vector calculus and matrix algebra

SUR 6536 Geodesy and Geodetic Positioning 3 Credits
Grading Scheme: Letter Grade
Introduction to geometric and physical geodesy, ellipsoids, geodetic lines, computation or position, gravity and coordinate systems.
Prerequisite: SUR 3103C or instructor consent.

SUR 6905 Special Problems in Geomatics 1-6 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Individual study of a selected topic in Geomatics as contracted with the instructor at the start of the term.

SUR 6934 Topics in Geomatics 1-4 Credits, Max 10 Credits
Grading Scheme: Letter Grade
Rotating Topic.

SUR 6940C Practicum in UAS Mapping 3 Credits
Grading Scheme: Letter Grade
Provides students hands-on experience with flight planning and safe deployment of small UASs (Unmanned Aerial Systems), and the subsequent processing of the imagery acquired on these flights.
Prerequisite: SUR6502C Foundations of UAS Mapping