**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:* Familiarity with ArcGIS and some exposure to programming (specific language not required), to be determined by instructor (approval of instructor required). Course will be departmentally controlled.

**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 6377 Geospatial Application of UASs 3 Credits**
*Grading Scheme:* Letter Grade
Covers contemporary issues and common applications associated with small UASs (Unmanned Aerial Systems).
*Prerequisite:* SUR 6502C Foundations of UAS Mapping.

**SUR 6427 Land Tenure and Administration 3 Credits**
*Grading Scheme:* Letter Grade
*Prerequisite:* graduate status.

**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 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 UAs (Unmanned Aerial Systems), and the subsequent processing of the imagery acquired on these flights.
*Prerequisite:* SUR6502C Foundations of UAS Mapping.