SURVEYING AND GEOMATICS (SG)

SG 098  Directed Study  0.5-9 Units
Individual or small groups of students who would benefit from Independent Study under the direction of faculty members in specific or related disciplines may develop individualized learning contracts designed to enhance their individual instructional programs. The students and the faculty member in consultation with the Division Dean will determine appropriate learning objectives and activities as well as the number of units to be earned. Instructions and the Learning Contract forms are available in the Division Office. Repeatable to a maximum of 9 units across all disciplines.

Lecture Hours: None  Lab Hours: 2.07  Repeatable: Yes  Grading: L
Prerequisite: Please see the Learning Contract and Course Outline for any prerequisites.
Advisory Level: Read: 3  Write: 3  Math: None
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 100  Applied Math for Land Surveying  1 Unit
This course presents math concepts and skills required in land surveying and mapping. The course covers topics in geometry and trigonometry related to surveying problem-solving. Intersections of lines and circles are discussed and so are the formulas used in horizontal and vertical curves.

Lecture Hours: None  Lab Hours: 3  Repeatable: No  Grading: L
Recommended: Completion of Geometry, in high school or college
Advisory Level: Read: 3  Write: 3  Math: None
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 141  Boundary Control and Legal Principles  3 Units
This course provides the student with an understanding of and the ability to apply legal principles used in determining land boundaries. The student will understand the importance of recovering monuments and how to address lost monuments in analyzing a land boundary. This course will also provide the student with the general background for areas of the land surveyor examination and the National Council of Examiners for Engineering and Surveyors (NCEES) Land Surveyors-In-Training examination devoted to this topic. Discussions include land ownership, title, conveyances and legal descriptions of real properties, types of land boundaries, boundary laws and presumptions, resurveying and retracing, easements, conveyances and the role of the land surveyor.

Lecture Hours: 3  Lab Hours: None  Repeatable: No  Grading: L
Recommended: ENGR 060 and ENGR 061; surveying experience
Advisory Level: Read: 3  Write: 3  Math: None
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 142  California Coordinate System  1 Unit
This course introduces students to the theory of the California Coordinate System and its application in modern surveying and geomatics practices; conversion of geodetic coordinates to and from state plane coordinates; zone to zone conversion; and converting lengths to and from the grid to ground. This course will also provide the student with the general background for areas of the land surveyor examination and the National Council of Examiners for Engineering and Surveying (NCEES) Land Surveyors-In-Training examination devoted to this topic.

Lecture Hours: 1  Lab Hours: None  Repeatable: No  Grading: L
Recommended: ENGR 060 and SG 100
Advisory Level: Read: 3  Write: 3  Math: None
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 143  Introduction to Photogrammetry  1 Unit
This course provides an introduction to principles of photogrammetry, geometry of photographs, flight planning, ground control, airborne laser mapping (LiDAR - Light Detection And Ranging), airborne GPS, stereoscopic plot, Unmanned Aircraft Systems (UAS-drones), orthophoto, photogrammetric mapping, applications, and photogrammetric instrumentation. This course will also provide the student with the general background for areas of the land surveyor examination and the National Council of Examiners for Engineering and Surveying (NCEES) Land Surveyors-In-Training examination devoted to this topic.

Lecture Hours: 1  Lab Hours: None  Repeatable: No  Grading: L
Recommended: ENGR 060 and ENGR 061; surveying experience
Advisory Level: Read: 3  Write: 3  Math: None
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 145  Astronomy for Surveyors  1 Unit
This course provides an introduction to astronomical procedures relating to the determination of latitude, time, and azimuth as observed with the surveying instruments. This course will also provide the student with the general background for areas of the land surveyor examination and the National Council of Examiners for Engineering and Surveying (NCEES) Land Surveyors-In-Training examination devoted to this topic.

Lecture Hours: 1  Lab Hours: None  Repeatable: No  Grading: L
Recommended: ENGR 060 and ENGR 061; surveying experience
Advisory Level: Read: 3  Write: 3  Math: 3
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None
SG 146  CADD for Civil Engineering, Surveying and Land Development  3 Units
This is a course on computer-aided design and drafting for civil engineering, surveying and land development. AutoCAD Civil 3D software program will be utilized. Students will acquire the necessary computer skills to use the software for applications in civil engineering design, surveying and land development projects. Topics include basic drawing component management, terrain surface modeling and contours, alignments and stationing, cross sections, volume computation, and profiles. In addition, the course will discuss various applications in civil engineering and land surveying.

Lecture Hours: 2  Lab Hours: 3  Repeatable: No  Grading: L
Recommended: SG 100, ENGR 018 and ENGR 060
Advisory Level: Read: 3  Write: 3  Math: None
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 147  Global Positioning System for Land Surveying  3 Units
Fundamentals of the global positioning system (GPS) and its applications in land surveying are introduced. The discussions include the three segments of GPS technology, i.e., the space segment that consists of a constellation of 24 satellites orbiting around the earth, the control segment that consists of five ground monitoring stations, and the user segment that consists of two categories of receivers. Among the topics studied are GPS observations, planning for a GPS field survey, GPS data processing, and GPS surveying techniques. Emphasis is given to practical applications of GPS technology in surveying.

Lecture Hours: 2  Lab Hours: 3  Repeatable: No  Grading: L
Recommended: ENGR 061 or equivalent
Advisory Level: Read: 3  Write: 3  Math: 4
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 148  Maps, Subdivision Map Act and Land Surveyors Act  3 Units
This course is designed to present both theoretical and practical mapping experience in the preparation of subdivision maps, records of surveys, plats, exhibits, topographic maps, American Land Title Association (ALTA) maps, route and rights-of-way maps. Requirements of the Subdivision Map Act and the Land Surveyors Act are studied. Techniques of the reduction of field survey notes and the preparation of improvement plans are also presented. This course will also provide the student with the general background for areas of the land surveyor examination and the National Council of Examiners for Engineering and Surveying (NCEES) Land Surveyors-In-Training examination devoted to this topic.

Lecture Hours: 2  Lab Hours: 3  Repeatable: No  Grading: L
Recommended: ENGR 060 and ENGR 061 or SG 141 or ENGR 063 or SG 146
Advisory Level: Read: 3  Write: 3  Math: None
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 149  3D Laser Scanning for Land Surveying  3 Units
This course introduces students to the fundamental principles of laser scanning for land surveying. The implementation of time-of-flight measurement and interaction of laser beams with various types of surfaces are examined. Students will learn the structure of a 3D laser scanner, its operation in the field, data collection and geo-referencing. Topics on post-measurement processing include data transfer to an office computer, point cloud registration and calibration, data filtering and checking, mesh and surface generations, digital image calibration, 2D drawing generation, feature code management and animations. Several applications in land surveying are discussed.

Lecture Hours: 2  Lab Hours: 3  Repeatable: No  Grading: L
Recommended: ENGR 060, with minimum grade C
Advisory Level: Read: 3  Write: 3  Math: 4
Transfer Status: CSU  Degree Applicable: AA/AS
CSU GE: None  IGETC: None  District GE: None

SG 500  Introduction to Surveying & Geomatics  0 Units
This introductory course in surveying and geomatics details various aspects of the surveying profession. It includes information on the past and current technologies that are utilized in performing land surveys. Various fields such as land surveying, remote sensing, geographic information systems, global navigation satellite systems, photogrammetry, and mapping are introduced. Preparation and skills needed to successfully complete a surveying and geomatics education and compete in the profession are detailed. Some historical prospective is included in order to provide a comprehensive view of the field. This course is intended to provide a general overview of the surveying field to those who are planning on pursuing a vocational technical career.

Lecture Hours: 1.5  Lab Hours: None  Repeatable: Yes  Grading: N
Recommended: Be able to use computers and the Internet
Advisory Level: Read: 2  Write: 2  Math: None
Transfer Status: None  Degree Applicable: NC
CSU GE: None  IGETC: None  District GE: None

SG 502  Basic Math Applications in Surveying and Geomatics  0 Units
This application-oriented course is for those interested in pursuing a surveying and geomatics career. Problems and calculations encountered in land surveying, GPS, GIS, photogrammetry, boundary and legal principles, mapping, and laser scanning areas are discussed and practiced through the use of appropriate basic math concepts. This course is intended to encourage and attract students into the surveying profession by providing a basic training and understanding of how technical problems are solved using basic math concepts such as operations of fractions and decimals, percent, ratios and proportion, calculator usage, signed numbers, evaluating formulas, equation solving, geometry, the metric system, and measurement tools.

Lecture Hours: 2  Lab Hours: None  Repeatable: Yes  Grading: N
Recommended: Be able to use computers and the Internet
Advisory Level: Read: 2  Write: 2  Math: None
Transfer Status: None  Degree Applicable: NC
CSU GE: None  IGETC: None  District GE: None
SG 504  Technical and Contextualized Communication in Surveying  0 Units
This course is designed to develop proficiency in specific integrated and contextualized reading, writing, visualization, and speaking skills and strategies relevant to technical and scientific professions. Topics include reading and writing processes, critical thinking strategies, recognition and composition of coherent and unified texts, effective visualization and public speaking. Through individual and collaborative projects, students will gain practice in researching, designing, and evaluating appropriate communications for varying rhetorical situations. Using both print and computer-based technologies, students will develop abilities to create and critically analyze documents so that they engage and inform readers in a variety of circumstances.

Lecture Hours: 2  Lab Hours: None  Repeatable: Yes  Grading: N
Recommended: Be able to use computers and the Internet
Advisory Level: Read: 2  Write: 2  Math: None
Transfer Status: None  Degree Applicable: NC
CSU GE: None  IGETC: None  District GE: None

SG 506  Basic Principles of Surveying  0 Units
This course is a survey of basic principles and concepts used in surveying and geomatics. Students are exposed to applications of these concepts in order to provide basic understanding of the field of surveying and survey design through hands-on activities and problem-based learning. Topics include principles of land surveying, mapping, photogrammetry, astronomy, coordinate systems, geographic information system, global positioning systems, civil 3D CADD, and laser scanning. Team work in performing projects is an essential component of the course which challenges students to continually improve their interpersonal skills, creative abilities, and problem solving skills based upon surveying concepts.

Lecture Hours: 1.5  Lab Hours: None  Repeatable: Yes  Grading: N
Recommended: Be able to use computers and the Internet
Advisory Level: Read: 2  Write: 2  Math: None
Transfer Status: None  Degree Applicable: NC
CSU GE: None  IGETC: None  District GE: None