COURSE SYLLABUS

LAST REVIEW   Fall 2022

COURSE TITLE   Geographic Information System (GIS)

COURSE NUMBER   SURV 0106

DIVISION   Career and Technical Education

DEPARTMENT   SURV

CIP CODE   15.1102

CREDIT HOURS   **3**

CONTACT HOURS/WEEK **Class:** 2   **Lab:** 2

PREREQUISITES   SURV 0102 and SURV 0104

COURSE PLACEMENT Students must meet the correct placement measure for this course. Information may be found at: https://www.kckcc.edu/admissions/information/mandatory-evaluations-placement.html

COURSE DESCRIPTION

This course teaches fundamental concepts in the use of geographic information systems (GIS) to students preparing for work in the geospatial professions. This course will enable the student to understand spatial referencing concepts, in the use and application of Geographic Information Systems. Students will be introduced to GIS software systems that are used to collect, correct, map, and analyze geospatial data. Advanced topics in the use of GIS including spatial referencing concepts and data display concepts will be covered extensively, including surveying applications as well as other GIS applications in engineering, construction, and related industries. Students will create projects in several areas of applications in surveying and mapping.

Program Learning Outcomes

1. Prepare students with a holistic education for a long-term career as a responsible licensed professional in land surveying with educational content that includes: the science of making measurements; proper use of technology; ability to perform analysis on and adjust surveying measurements; understand the legal aspects of boundary surveying including retracement of original surveys; interpret, write and survey land descriptions; and understand the basic principles of managing a surveying business.
2. Have an active, engaged professional advisory committee that aligns the educational objectives such that the program reflects changes in technology,

regulatory laws, rules and regulations and complies with professional standards of conduct.
3. Partner with professionals, service companies and technology providers in the surveying industry as well as government entities to enable student internships, employment opportunities, engagement with the public, and student scholarships and grants.
4. Graduates will, upon graduation, be prepared to take and pass the NSPS Level I Certified Survey Technician exam.

TEXTBOOKS
http://kckccbookstore.com/

METHODS OF INSTRUCTION
A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE
I. Fundamental Concepts in Geographic Information Science
    A. Definition of GIS
    B. Vector and raster systems
    C. Scale, resolution, map projection
    D. Coordinate systems
    E. Applications of GIS
II. Geospatial Data
    A. Georeferencing & Global Navigation Satellite Systems (GNSS)
    B. Representing fields: raster, TIN, quadtrees, polygons
    C. Uncertainty propagation
III. Spatial Analysis
    A. Quantitative & statistical methods; introduction to map algebra
    B. Formulating geographic questions
    C. GIS as a modeling tool
IV. Information analysis: Georeferencing and stacking layers
V. Create and modify new and existing GIS layers and databases.
VI. Import GIS data from a variety of sources, create a new layer, and modify an existing layer.
VII. Commonly used coordinate systems, datums, and projections: Federal, state, and local governments and private sector.
VIII. Use GIS software to convert GIS data from one system to another: Coordinate systems, datum's, and projections.

IX.   Use of GIS: Perform elementary spatial analysis and understand the importance of spatial analysis in decision support.
X.   Discuss geospatial analysis: Georeferencing, data formats, and geodatabases
XI.   Create, modify, and maintain new and existing GIS layers and geodatabases.
XII.   Use of GIS: Perform elementary spatial analysis and understand the importance of spatial analysis in decision support.
XIII.   Plan, develop, conduct, manage, and complete an integrated GIS/GNSS project.

COURSE LEARNING OUTCOMES
Upon successful completion of this course, the student will:

A. Define and describe the application of Geographic Information Systems (GIS)
B. Compare and contrast vector and raster GIS.
C. Modify new and existing GIS layers.
D. Evaluate the capabilities of various GIS programs.
E. Explain uncertainty as it relates to scale, resolution, and projection; discuss uncertainty propagation within a GIS.
F. Apply cartographic principles of scale, resolution, projection, and data management to a problem of a geographic nature.
G. Use spatial referencing concepts and GIS/GNSS technology and its applications.
H. Acknowledge the impact that GIS/GNSS has had on the surveying industry.
I.   Apply the GIS and where applicable, GNSS technology, to the successful creation and maintenance of robust GIS databases.
J. Acknowledge the impact that GIS/GNSS has had on the surveying industry.
K. Perform and describe elementary spatial analysis and decision support.
L. Learn the value and applications of GIS specifically to various projects specific to surveying or disciplines that use surveying data.

ASSESSMENT OF COURSE LEARNING OUTCOMES
Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES
Student Handbook
https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf

College Catalog
https://www.kckcc.edu/academics/catalog/index.html

College Policies and Statements
https://www.kckcc.edu/about/policies-statements/index.html

Accessibility and Accommodations
https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html.