COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Global Navigation Satellite Systems (GNSS)
COURSE NUMBER	SURV 0104
DIVISION	Career and Technical Education
DEPARTMENT	SURV
CIP CODE	15.1102
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 3 Lab: 2
PREREQUISITES	SURV 0102
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 global navigation satellite systems (GNSS) to students preparing for work in the geospatial industries and professions. Students will understand spatial referencing concepts, and the similarities and differences between the leading global systems. Topics include introduction to GNSS receivers and GNSS software systems that are used to collect, correct, map, and analyze geospatial data. Elementary geophysical applications of GNSS will be learned. It also includes a discussion of and application of meter level, sub-meter level, and cm-level technologies and the results that can be generated from them in various surveying and mapping situations. Exercises using static, and kinematic surveying will be done, including design and processing. Students will learn to use the National Geodetic Survey's (NGS's) OPUS system to perform and deliver networked observation results. In all cases, there is a concentration on the fundamental issues so that students will gain an understanding of the basic limitations of the system and how to extend them application to areas.

Program Learning Outcomes

1. PLO #1
2. PLO #2

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 AND COMPETENCIES
I Fundamental concepts of spatial relationships of georeferencing in GNSS
II Concepts of the leading GNSS: Navigation, Tracking, and Positioning. Various GNSS surveys, methodologies, accuracies.
III How to use a handheld GNSS receiver, mark positions, and navigate to known positions
IV Concepts of Post processed and real time differential correction with GNSS
V Use of sub-meter accuracy GNSS receiver to establish positions with post-processed and real-time corrections. Navigate using real-time corrections.
VI. Post-process GNSS field data using data from local reference station and data from the Continuous Operating Reference Station (CORS) network.
VII. Real-time broadcast differences and corrections: Coast Guard Beacon DGNSS and Real-Time Kinematic GNSS.
VIII. Access a variety of GNSS data sources: Local reference stations and Continuous Operating Reference Stations (CORS)
IX. Commonly used coordinate systems, datums, and projections: Federal, state, and local governments, and private sector. Discuss geospatial analysis: Georeferencing, data formats, and geodatabases
X. Use a survey grade GNSS receiver to conduct a static GNSS survey.
XI. Post-process GNSS field data using: corrections from a local reference station and corrections from Continuous Operating Reference Station (CORS) network.
XII. Use a survey grade GNSS receiver to conduct a Real-Time Kinematic (RTK) survey and navigate using RTK
XIII. Establish geodetic control via existing NGS monuments and OPUS. Use as control for RTK. Discuss OPUS Projects
XIV. Create a GNSS survey network and adjust it.

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

1. The student will be able to use spatial referencing concepts and GNSS technology and its applications.
2. The student will be able to acknowledge the impact that GNSS has had on the surveying industry.
3. The student will be able to supply GNSS technology to the successful creation and maintenance of survey products relying on various levels of GNSS technology.

4. The student will be able to use a handheld receiver to restablishpositions and navigate corrections.
5. The student will understand the differences between post-processed and real time corrections.
6. The student will be able to interpret from the Continuous Operating Reference Stations network.
7. The student will be able to describe differences and corrections between DGNSS and GNSS.
8. The student will be able to interpret and acess related data sources.
9. The student will be able to describe and understand geospatial analysis.
10. The student will be able to use a survey grade receiver.
11. The student will be able to post-process GNSS field data.
12. The student will be able to describe, navigate and conduct Real-Time Kinematic surveys.
13. The student will able to establish geodetic control.
14. The student will be able to create a GNSS survey network.

ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES
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.