# GEOG 0085 - APPLICATION OF GEOSPATIAL TECHNOLOGIES

## Catalog Description

Hours: 18 lecture
Description: Investigation of Geographic Information Systems (GIS) case studies used in industry and government; explores how industry uses GIS with emphasis on natural resource management and watershed analysis. Additional focus on remote sensing, aerial photography, GPS technology. (CSU)

## Course Student Learning Outcomes

- CSLO #1: Research GIS case studies for any industry of choice, with focus on application to solve real-world problems.
- CSLO #2: Distinguish between base map features and thematic map features for a particular application, such as watershed mapping.
- CSLO #3: Compare and contrast different remote sensing products and applications, discussing advantages and disadvantages.
- CSLO #4: Summarize the key elements of Global Positioning Systems (GPS) including aspects of proper set-up, positional accuracy, corrections methods, and output to mapping software.

## Effective Term

Fall 2021

## Course Type

Credit - Degree-applicable

## Contact Hours

18

## Outside of Class Hours

36

## Total Student Learning Hours

54

## Course Objectives

1. Define GIS industry standard terms.
2. Conceptualize how GIS is used in various industries, for example, to manage a watershed's health so that anadromous fish (like salmon and steelhead trout) can maintain a viable population in the wild. The lecture example illustrates how the the Dry Creek Conservancy has built a working GIS, including an awareness of various GIS layers used and needed to construct and maintain.
3. Research GIS case studies for any industry of choice, producing an annotated bibliography.
4. Distinguish between base map and thematic layers using examples.
5. Research and organize a GIS case presentation.
6. Compare different remote sensing products, discussing advantages and disadvantages.
7. Identify key elements of Global Positioning Systems (GPS), including mapping systems, accuracy, and GPS case studies.

## General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

## Articulation Information

- CSU Transferable

## Methods of Evaluation

- Classroom Discussions
  - Example: 1. Students research various case studies in remote sensing and then share how this information is used to assemble a GIS to solve real-world problems.
- Objective Examinations
  - Example: 1. Quizzes are given to assess GIS standard terms and concepts. Additionally, students must demonstrate ability to present their own GIS case study addressing criteria such as set of base map layers, thematic map layers, problems solved with GIS and maps produced. This is then posted on Discussions for all to see and comment. Example: Photogrammetry would best be describe as: a) the art and science of obtaining information about an object without being in direct contact with that object b) sophisticated sensors to detect all types of materials on Earth, such as vegetation, rocks, soil, water, and urban infrastructure. c) matching the photographic edges to mosaic a set of aerial photographs d) the art and science of making accurate measurements by means of aerial photography Answer is d - the art and science of making accurate measurements by means of aerial photography
- Projects
  - Example: 1. After students read basic concepts regarding remote sensing, they are required to research a relevant case study, perhaps one related to their main case study or area of focus, then write an annotated bibliography formatted with a summary and source. This is then posted on Discussions for all to see and comment.
- Reports
  - Example: 1. After students read basic concepts regarding remote sensing, they are required to research a relevant case study, perhaps one related to their main case study or area of focus, then write an annotated bibliography formatted with a summary and source. This is then posted on Discussions for all to see and comment. 2. Students research all of the components of a GIS, for example the use of map layers including aerial photographs, remotely sensed spectral reflections data, lidar, etc. along with GPS data if needed, to present a unique case study to the students.

## Repeatable

No

## Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. Instructor will lecture and provide examples of how the Dry Creek Conservancy has created a GIS to solve real-world problems, namely the health of the local stream behind the Sierra College Rocklin campus. Included in the development of the base map GIS layers as well as created & maintained thematic layers. Student are expected participate in the lecture and discussion to see how a GIS can solve problems, such as maintaining the health of this watershed for the survival of this threatened species like salmon and steelhead.

Distance Learning

1. Instructor lecture on GIS to solve real-life problems. Students are expected to use the above example, coupled with the lecture materials, to find their own GIS case study that uses geographic map layers and GIS analysis to solve real-world problems; then share with students via the discussion board.

## Typical Out of Class Assignments
## Reading Assignments

1. Read and evaluate lecture notes and articles from the Internet to understand basic components of a base map. Look at a specific case study (a local watershed study, for example), then identify base map and thematic map components for this case study and be prepared to discuss in class. 2. Using the Internet to research GeoSpatial industries, such as agriculture, determine the purpose of the GIS effort, the list of challenges, the base and thematic map layers, and final outcome or product to help solve their problem and be prepared to discuss in class.

## Writing, Problem Solving or Performance

1. Create annotated bibliography of various GIS case studies of interest and present to class via the discussions, so that every can see your posting. 2. Using the Internet to research GeoSpatial industries, such as a watershed management, or industry of choice. Once you have done your reading research, then develop a PowerPoint type of presentation with lots of maps and pictures roughly 10 -20 slides in length. It should include: purpose, challenges, base and thematic layer, and some outcomes like maintaining the health of a watershed.

## Other (Term projects, research papers, portfolios, etc.)

1. Publish presentation on discussion (via online)

## Required Materials
## Other materials and-or supplies required of students that contribute to the cost of the course.

Access to Internet for reading and case study research.