GEOG C155: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS AND TECHNIQUES WITH LAB

Item	Value
Curriculum Committee Approval Date	04/28/2023
Top Code	220610 - Geographic Information Systems
Units	3 Total Units
Hours	72 Total Hours (Lecture Hours 45; Lab Hours 27)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

An introduction to the concepts and use of Geographic Information Systems (GIS) and its role in analysis and decision making. Course work is based on the mapping and spatial analysis capabilities of GIS software programs. Students will be introduced to basic cartographic principles, maps, resolution, scale, coordinate systems, vector and raster systems, projections, and Global Positioning Systems (GPS). Through computer lab tutorials and case studies, students will learn to use GIS software to view relationships, patterns, or trends that are not possible to see with traditional charts, graphs, and spreadsheets. Enrollment Limitation: CIS C190; students who complete GEOG C155 may not enroll in or receive credit for CIS C190. Transfer Credit: CSU; UC. C-ID: GEOG 155.**C-ID:** GEOG 155.

Course Level Student Learning Outcome(s)

1. Effectively make, share, analyze, and interpret maps and spatial information using Geographic Information Systems (GIS).
2. Build geodatabases, query data, and analyze geospatial data using Geographic Information Systems (GIS).

Course Objectives

- 1. Define Geographic Information Systems (GIS) Identify and evaluate GIS data sources and the importance of metadata.
- 2. Demonstrate the process of converting analogue data to digital data for use in a GIS Identify, compare and contrast vector and raster GIS. Evaluate the capabilities of various GIS software programs.
- 3. Apply cartographic principles of scale, resolution, projection and data management to a problem of a geographic nature. Apply spatial analysis functions on a GIS to solve a Geospatial problem.

Lecture Content

Fundamental Concepts in Geographic Information Systems Definition of GIS Vector and raster systems Scale and resolution Map projections and coordinate systems Applications of GIS Basics of cartographic design GIS Data Sources Identify sources of GIS data Metadata Georeferencing and Global Positioning Systems (GPS) Converting digital data to a uniform projection and scale. Vector-to-raster and raster-to-vector data conversions, error propagation Designing and Implementing a GIS User needs assessment Database design and management Fundamentals of data storage Database management Input of data with GPS Digitizing, scanning, editing and output Spatial Analysis Map algebra Buffering Interpolation and surface analysis Network analysis Applications in Decision-Making Modeling

Lab Content

Utilize GIS software in laboratory activities to meet objectives of course content. Laboratory activities include, but are not limited to: Plan, evaluate and execute a GIS project Identify a problem of a geospatial nature Outline a strategy to solve the problem Locate relevant data sources Design and evaluate a plan to acquire the relevant data sources Incorporate data sources into a Geographic Information System and execute strategy to solve a geospatial problem Apply principles of spatial analysis Present results

Method(s) of Instruction

- Lecture (02)
- DE Online Lecture (02X)
- Lab (04)
- DE Online Lab (04X)

Instructional Techniques

1. Lecture 2. GIS laboratory assignments that coordinate with the lectures 3. Group discussions 4. Collaborative assignments

Reading Assignments

Assigned from textbook and supplemental materials.

Writing Assignments

1. Class discussions. 2. Essay exam questions. 3. Written Assignments related to class topics.

Out-of-class Assignments

Research paper, written assignments.

Demonstration of Critical Thinking

1. Objective examinations covering text and materials. 2. Written papers exploring issues related to GIS. 3. Evaluation of computer laboratory exercises. 4. Final project demonstrating GIS applications and skill.

Required Writing, Problem Solving, Skills Demonstration

1. Weekly GIS related discussions. 2. Short essays exploring issues related to GIS. 3. Final project demonstrating GIS applications and skill.

Eligible Disciplines

Computer information systems (computer network installation, microcomputer ...: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Geography: Master's degree in geography OR bachelor's degree in geography AND master's degree in geology, history,

meteorology, or oceanography OR the equivalent OR see interdisciplinary studies. Master's degree required.

Textbooks Resources

1. Required Gorr, WL.; Kurland, KS. GIS Tutorial 1: Basic Workbook, for ArcGIS, 10.3 ed. Redlands: ESRI, 2020

Software Resources

1. ArcGIS Pro. ESRI, 2.9 ed. The assignments are accessed and completed through Coastline's ESRI organization page. Each student receives a link to register on the site at the start of class. After registering on the site, students will then be able to download the required software for ArcGIS Pro version 2.9 from ESRI.

Other Resources

1. Coastline Library 2. In addition to the GIS software program, each module includes instructor assigned readings and/or media each week.