GIS 51 Course Outline as of Fall 2023

CATALOG INFORMATION

Dept and Nbr: GIS 51   Title: INTERMEDIATE GIS
Full Title: Intermediate Geographic Information Systems (GIS)
Last Reviewed: 1/23/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	8	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00   Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable
Grading: Grade Only
Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:
Formerly:

Catalog Description:
Students will be introduced to intermediate level concepts of Geographic Information Systems (GIS). Topics include GIS elements, data structures and their management, and intermediate raster and vector geoprocessing functions. The course covers technical mapping standards and cartographic display. Hands-on exposure to GIS technology through the use of computers and industry standard software is provided during the laboratory.

Prerequisites/Corequisites:
Course Completion of GIS 40 and APTECH 191

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Students will be introduced to intermediate level concepts of Geographic Information Systems (GIS). Topics include GIS elements, data structures and their management, and intermediate raster and vector geoprocessing functions. The course covers technical mapping standards and cartographic display. Hands-on exposure to GIS technology through the

use of computers and industry standard software is provided during the laboratory. (Grade Only)
Prerequisites/Corequisites: Course Completion of GIS 40 and APTECH 191
Recommended:
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

			Effective:	Inactive:
AS Degree:	**Area**		Effective:	Inactive:
CSU GE:	**Transfer Area**		Effective:	Inactive:
IGETC:	**Transfer Area**		Effective:	Inactive:
CSU Transfer:	Transferable	Effective: Spring 2009	Inactive:
UC Transfer:		Effective:	Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Create, explore, edit, and analyze geographic data
2. Prepare reports, charts, and map layouts
3. Describe and implement the steps necessary to answer a geographic question
4. Produce finished quality maps representing spatial analyses, basic survey maps, and scaled diagrams within a story map

Objectives:
At the conclusion of this course, the student should be able to:
1. Demonstrate an understanding of the structure and organization of the software package
2. Create a map project using GIS software
3. Define and apply the relationship of geographic features and attribute data
4. Perform feature identification and classification
5. Perform query and analysis functions
6. Define and edit spatial relationships
7. Create a map layout
8. Integrate GIS with other software and technology
9. Utilize basic cartographic principles in designing and producing maps

Topics and Scope:

Lecture-Related Topics and Scope:
I. Identify Source Files
   A. Local and web-based links to files
   B. How to manage files and data in the project

II. Perform Geocoding for Geographic Location
III. Perform Selection by Location for Data Analysis
IV. Perform Spatial Database Joins
V. Overlay Analyses
    A. Proximity
    B. Spatial data processing
    C. Clip data tools and demonstration
    D. Dissolve data tools and demonstration
    E. Append to data tools and demonstration
    F. Union function tools and demonstration
VI. Utilize GIS Software Features
    A. Create metadata and internal metadata documentation
    B. Utilize ArcToolbox features
    C. Create custom tools
VII. Map Design and Production
    A. Maps and map series
    B. Reports with embedded maps
    C. Graphs in maps and reports
VIII. Create and Edit Geodatabases
IX. Import/Export, Create, and Edit Mixed Data Sources
    A. Mixed data formats
    B. Computer Assisted Drafting and Design (CADD)
    C. Interchange files
    D. Text and comma-separated values (CSV) files
    E. Microsoft Excel and Access files
X. Intermediate Level Analysis Functions
    A. Queries
    B. Attribute joins
    C. Spatial joins
    D. Edit attributes
    E. Create and utilize centroids
XI. Intermediate Level Statistical Analysis
XII. Summary Tables, Spatial Adjustment, and Georeferencing
XIII. GIS Design
    A. GIS design overview
    B. Software engineering approach
    C. Structured design model
    D. Formal GIS design methodology
    E. Verification and validation
XIV. GIS Output
    A. Display of analytic data
    B. Cartographic considerations in technical mapping
    C. Map design controls
    D. Nontraditional cartographic output
    E. Non-cartographic output
    F. Technology and GIS output

Lab-Related Topics and Scope:
I. Environmental Systems Research Institute (ESRI) Web-based Modules
    A. Solving spatial problems
    B. Analysis of raster data
    C. Deriving terrain rasters

D. Raster site selection
E. Analysis of vector data
F. Distance analysis
G. Exploring spatial patterns
H. Introduction to surface models
I. Three-dimensional (3D) visualization techniques

Assignment:

Lecture-Related Assignments:
1. Textbook reading (1-3 chapters per week)
2. Essay writing assignments (2-5)
3. Exam(s) (1-4)
4. Final project (1)

Lab-Related Assignments:
1. Lab assignments (6-12)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Essays	Writing 10 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab assignments	Problem solving 40 - 50%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Exam(s)	Exams 40 - 50%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
GIS Fundamentals, A First Text on Geographic Information Systems, 6th ed. Bolstad, Paul. Eider Press. 2019.

Lining Up Data in ArcGIS: A Guide to Map Projections, 3rd ed. Maher, Margaret. ESRI Press. 2018.
Modeling Our World: the ESRI Guide to Geodatabase Concepts, 2nd ed. Zeiler, Michael. ESRI Press. 2010 (classic).
Instructor prepared materials