GIS 40 Course Outline as of Summer 2022

CATALOG INFORMATION

Dept and Nbr: GIS 40   Title: INTRO TO GIS
Full Title: Introduction to Geographic Information Systems (GIS)
Last Reviewed: 2/24/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	3.00	8	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00   Total Student Learning Hours: 210.00

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: GIS 50

Catalog Description:
The course introduces students to fundamental concepts of Geographic Information Systems (GIS). Topics include elements of GIS, data structures and their management, introductory input and output functions and mapping possibilities. Hands-on exposure to GIS technology through the use of computers and current industry standard software is provided during the laboratory. A working knowledge of the Microsoft Windows operating system and Microsoft Office is recommended.

Prerequisites/Corequisites:

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: The course introduces students to fundamental concepts of Geographic Information Systems (GIS). Topics include elements of GIS, data structures and their management, introductory input and output functions and mapping possibilities. Hands-on exposure to GIS

technology through the use of computers and current industry standard software is provided during the laboratory. A working knowledge of the Microsoft Windows operating system and Microsoft Office is recommended. (Grade Only)
Prerequisites/Corequisites:
Recommended:
Limits on Enrollment:
Transfer Credit: CSU;UC.
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:	Transferable	Effective:	Fall 2009	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. Define the elements of a Geographic Information System (GIS)
2. Describe the applications of GIS for different disciplines
3. Create a GIS using raster image, raster surface, geographic and database information
4. Perform basic geoprocessing software steps to answer geographic questions

Objectives:
At the conclusion of this course, the student should be able to:
1. List the primary functions of a GIS.
2. Understand elementary spatial analysis of data.
3. Define image, geographic and database methods of representing data.
4. Describe the differences between Computer Aided Design (CAD) and GIS.
5. Use different types of graphic symbols.
6. List and identify different file structures and their advantages and disadvantages.
7. Describe data storage, editing and retrieval techniques used in a GIS.
8. Create a GIS using image, geographic and database information.

Topics and Scope:

I. Introduction to GIS
   A. the purpose and scope of a GIS
   B. GIS data sources: image, geographic and database information
   C. GIS terminology

II. Spatial Analysis
    A. spatial awareness
    B. spatial elements
    C. geographic data collection
    D. population and sampling schemes
    E. making inferences from data

III. Maps as a Model of Geographic Data
    A. map as a model
    B. map scale and characteristics
    C. map projections
    D. thematic maps
    E. cartographic process

IV. Cartographic and GIS Data Structures
    A. terms
    B. computer file structures
    C. computer database structures for managing data
    D. graphic representation of entities and attributes
    E. vector data models
    F. raster data models
    G. GIS data models for multiple coverages

V. GIS Data Input
    A. input subsystems
    B. methods of input
    C. external databases

VI. Data Storage and Editing
    A. storage of GIS database
    B. simple analysis framework
    C. detecting and editing changes
    D. dealing with projection changes
    E. joining adjacent coverages

VII. Elementary Spatial Analysis
    A. terms
    B. simple analysis framework
    C. defining objects based on their attributes
    D. working with higher level objects
    E. sample applications of these concepts

VIII. Spatial Arrangement
    A. point, area, and line arrangement
    B. point patterns
    C. linear patterns
    D. raster surfaces
    E. routing and allocation
    F. sample applications

IX. GIS Design
    A. the need for GIS design
    B. the software engineering approach
    C. structured design model
    D. formal GIS design methodology
    E. verification and validation

X. GIS Output
    A. applications in different disciplines
    B. cartographic output

C. map design controls
D. nontraditional cartographic output
E. non-cartographic output
F. technology and GIS output

All topics are covered in the lecture and lab portions of the course.

Assignment:

Lecture-Related Assignments:
1. Textbook reading (1-2 chapters/week)
2. Written assignment(s) (0-4)
3. Midterms (2-3)
4. Final exam (0-1)
5. Final presentation (0-1)

Lecture- and Lab-Related Assignments:
1. Weekly lab assignments
2. Weekly data exploration and mapping assignments
3. GIS mapping project

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.

Written assignments	Writing 0 - 15%

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

Lab assignments, data exploration and mapping assignments, GIS mapping project	Problem solving 40 - 80%

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.

Mid-terms, final exam	Exams 20 - 30%

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

Final presentation	Other Category 0 - 15%

Representative Textbooks and Materials:
Fundamentals of Geographic Information Systems, John Wiley & Sons, Inc., NY. DeMers M.N. (2008 classic)
GIS Fundamentals, P. Bolstad; Eider Press, 6th edition, 2019
Introductory Geographic Information Systems, Jensen and Jensen; Prentice Hall, 2012 (classic)
Instructor prepared materials