Lassen Community College Course Outline

GIS 2 – GIS Data Concepts 3.0 Units

I. Catalog Description

This course covers concepts and techniques associated with geospatial data, including detailed examination of the design and implementation of geodatabases for Geographic Information Systems (GIS). Relational database management systems (RDBMS), and their functionality in relation to GIS, are a key concept in the course. Other concepts such as data integration, organization, and quality assurance; attribute information classification; feature digitization and editing; and geocoding will be covered as well. This course has been approved for online and hybrid delivery.

Co-requisite(s): Concurrent enrollment in GIS 1.

Recommended Preparation: Students will need basic computer skills, and a strong and reliable Internet connection, to successfully attend this course.

Transfer Status: CSU/UC
34 hours lecture, 68 hours outside of class, 51 hours laboratory, 153 Total Hours of Instruction
Scheduled: Fall and Spring semesters

II. Coding Information

Repeatability: Not Repeatable, Take 1 Time
Grading Option: Graded or Pass/No Pass
Credit Type: Credit - Degree Applicable
TOP Code: 2206.10

III. Course Objectives

A. Course Student Learning Outcomes

Upon completion of this course the student will be able to:

1. Create a geodatabase, incorporating basic components such as feature datasets, feature classes, object classes, domains and subtypes, and other functionality.
2. Implement data geocoding as a means of capturing GIS data and information.

B. Course Objectives

Upon completion of this course the student will be able to:

1. Explain the fundamental concepts of a relational database, and compare and contrast it with the unique capabilities of a specialized geodatabase.
2. Demonstrate an understanding of GIS data storage and organization, as well as data interoperability issues.
3. Collect or create, and process, geospatial data in a variety of formats and conditions.
4. Perform GIS data conversion on both spatial and non-spatial data.
5. Connect spatial and non-spatial data and information.
6. Create a geodatabase, incorporating basic components such as feature datasets, feature classes, object classes, domains and subtypes, and other functionality.
7. Demonstrate knowledge of advanced data integrity concepts such as topology.

8. Successfully edit geospatial data while addressing accuracy and precision standards.
9. Implement data geocoding as a means of capturing GIS data and information.

IV. Course Content

A. Outline of Topics

1. Database Introduction
    a. Types of databases
    b. Flat files versus databases
    c. Relational databases versus geodatabases
    d. Capabilities of databases
    e. Table components
2. Database Design and Implementation
    a. User needs assessment
    b. Conceptual design and ER diagrams
    c. Primary and foreign keys
    d. Indexing
    e. Access issues
    f. Fields, records, and values
    g. Value input
3. Data Integration and Maintenance
    a. Data importing and exporting
    b. Data conversions
    c. Georeferencing possibilities
    d. Data sources
    e. Data accuracy and precision standards
    f. Data storage and organization
    g. Quality and assurance considerations
4. Building a Geodatabase
    a. Types of geodatabases
    b. Feature Datasets
    c. Feature Classes and Object Classes
    d. Other Classes – Relationship, Topology, etc.
    e. Subtypes and Domains
5. Geodatabase Use and Maintenance
    a. Summarizing and sorting information
    b. Querying data
    c. Simple data edits
    d. Design structure changes
    e. Data and structure integrity
    f. Sharing data and information
6. Geodatabase Data Development
    a. Advanced data digitizing
    b. Understanding the data editing protocol
    c. Data error identification and correction
    d. Data integrity – Topological issues
7. Geocoding
    a. Adding X/Y data
    b. Address geocoding

c. Data creation from angles and vectors

V. Assignments

A. Appropriate Readings

Additional readings may be assigned by the instructor, which will likely include information directly from the GIS software manufacturer of the GIS software that will be used in this course. The software manufacturer's name is Esri (https://www.esri.com/en-us/home).

B. Writing Assignments

Two research-based short papers will be required in this course, with each covering a current topic associated with a GIS theme that is specific to data concepts, which the instructor will choose during the time of instruction.

C. Expected Outside Assignments

It is expected that for a typical week of the course, a student will spend approximately one hour on lecture material, 1 – 2 hours on reading material, 3 – 4 hours on lab exercise material, and an additional 1 – 2 hours on discussions, engagement with other students or instructor, etc.

D. Specific Assignments that Demonstrate Critical Thinking

Discussions (usually every week), quizzes (approximately every other week), research papers (two throughout the course), exams (mid-term and final exams), and lab exercises (usually every week).

VI. Methods of Evaluation

Traditional Classroom Instruction

Term paper (topic choice, thesis statement, outline, bibliography, rough draft, final draft), homework, classroom discussion, essay, journals, lab demonstrations and activities, multiple choice quizzes, and participation.

Online Evaluation

A variety of methods will be used, such as: research papers, asynchronous and synchronous (chat/forum) discussions, online quizzes and exams, posting to online website and email communications using the districts approved learning management system.

Hybrid Evaluation

All quizzes and exams will be administered during the in person class time. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

X Traditional Classroom Delivery Correspondence Delivery

X Hybrid Delivery **X** Online Delivery

Traditional Classroom Instruction
Lecture, discussion, audio/visual aids, demonstration, group exercises, guest speakers, lab, individualized programs and other as needed.

Online Delivery
A variety of methods will be used, such as: research papers, asynchronous and synchronous (chat/forum) discussions, online quizzes and exams, posting to online website and email communications using the districts approved learning management system.

Hybrid Delivery
Hybrid modality may involve face to face instruction mixed with online instruction. A minimum of 1/3 of instruction, including 100% labs, will be provided face to face. The remaining hours will be taught online through a technology platform as adopted by the district.

VIII. Representative Texts and Supplies

Focus on Geodatabases – ArcGIS Pro, 1st edition, 2019, David Allen, ISBN = 9781589484450.

IX. Discipline/s Assignment

Forestry/Natural Resources, Drafting/CADD, Geography, Engineering Support

X. Course Status

Current Status: Active
Original Approval Date: 05/05/2020
Course Originator: Charles Shoemaker
Board Approval Date: 06/09/2020
Chancellor's Office Approval Date: 06/30/2020
Revised By:
Curriculum/Academic Standards Committee Revision Date: 10/03/2023
Reviewed for IPR, no changes recommended: 03/15/2022