Lassen Community College Course Outline

GIS 1 – Fundamentals of GIS 4.0 Units

I. Catalog Description

This course covers theoretical and applied knowledge of Geographic Information Systems (GIS). Students will learn the basic history of GIS, as well as what it is, how it functions, and why it is used to benefit real-world, problem-solving applications. Geospatial data, and associated information, will be a core component of the course, including acquisition, development, maintenance, manipulation, analysis, and display of content. Spatial parameters (i.e., projections, coordinate systems, datums, and units of measure), geodatabase structures and use, basic cartographic skills, and simple overlay analysis and geoprocessing techniques are covered as well. This course is offered in traditional, online, and hybrid modalities.

Co-requisite(s): Concurrent enrollment in GIS 2

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

Transfer Status: CSU/UC
51 hours lecture, 102 Outside Class Hours, 51 hours laboratory, 204 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. Address the capabilities, limitations, and applications of a GIS, and adequately describe such features in terms of a perceived real-world deployment of a GIS system.
2. Prepare a completed map, with effective format, layout, symbology, labels and annotation, and other applicable map elements intact.

B. Course Objectives

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

1. Describe the history of GIS and how it came to fruition.
2. Address the capabilities, limitations, and applications of a GIS, and adequately describe such features in terms of a perceived real-world deployment of a GIS system.
3. Acquire, maintain, manipulate, and display geospatial data, in a variety of formats and conditions.
4. Compare and contrast basic geospatial data models: Vector and raster.

5. Demonstrate a working knowledge of the two basic components of geospatial data: Spatial features and attribute information.
6. Perform extensive use and manipulation of both spatial features and corresponding attributes, via capture and editing of such data.
7. Acquire geospatial data through both primary and secondary sources (i.e., user-derived and outside-entity sources).
8. Georeference unreferenced geospatial data in imagery and/or CAD format.
9. Perform successful data conversion operations, from one format to another, on a variety of different data formats.
10. Demonstrate sound knowledge of basic geoprocessing skills, such as vector overlay analysis and raster data processing.
11. Develop metadata for geospatial datasets.
12. Prepare a completed map, with effective format, layout, symbology, labels and annotation, and other applicable map elements intact.

IV. Course Content

A. Outline of Topics

1. Fundamentals of GIS
    a. Brief history of GIS
    b. Conceptual design of GIS systems
    c. GIS data models: Vector and Raster
    d. GIS data components: Spatial and attribute
    e. GIS system design
    f. GIS applications
2. Geospatial Data Management
    a. Data acquisition
    b. Primary and secondary data
    c. Data capture and editing
    d. Data conversion between various formats
    e. Working with Geodatabases
    f. Relational database concepts
    g. Georeferencing data
    h. Metadata development
3. Geospatial Data Analysis
    a. Attribute manipulation
    b. Queries and selections
    c. Spatial joins and relates
    d. Vector overlay analysis – Extractions, overlays, and buffers
    e. Raster analysis – Basic Map Algebra and Raster Calculator functions
    f. Geoprocessing-based modeling
4. Geospatial Data Representation and Basic Map Concepts
    a. Data classification
    b. Basic map layout design
    c. Symbology
    d. Labels and annotation
    e. Other map elements
    f. Ancillary map components – Tables, charts, graphs, images, etc.
    g. Export formats – Hardcopy and digital

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 general GIS theme, 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

GIS Fundamentals: A First Text on Geographic Information Systems, 6^{th} edition, 2019, Paul Bolstad, ISBN = 9781593995522.

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