

Lassen Community College Course Outline

GIS 3 – Cartography and Geovisualization

3.0 Units

I. Catalog Description

This course covers advanced concepts associated with cartography and geovisualization, as they relate to Geographic Information Systems (GIS). Cartographic principles will be covered in-depth, including enhanced map layout design and corresponding map element styling. Students will work with complex hardcopy and digital map outputs, including web-based visuals. Animations, 3D scenes, Story Maps, and other forms of geovisualization techniques are examined as well. This course has been approved for online and hybrid modalities.

Prerequisites: Grade of “C” or higher in both GIS 1 and 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

Total Hours: 34 hours lecture / 51 hours laboratory / 68 outside of class hours / 153 total student learning hours

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. Produce high quality map layouts, complete with standard and advanced map elements (i.e., layouts, tables, charts, graphs, images, logos), which show cartographic excellence.
2. Assess various map layouts for accurate and effective cartographic design principles.

B. Course Objectives

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

1. Describe similarities and differences in types of maps – Thematic versus reference maps, etc.
2. Explain the contents of a basic map layout regarding map element inclusion and design.
3. Demonstrate working knowledge of sound spatial parameter understanding (i.e., projection, coordinate system, datum, and unit of measure).
4. Assign applicable data, classification, symbology, scale, orientation, color, etc. to map layouts, in order to produce mapping products that effectively and efficiently communicate a desired purpose to end-users.

5. Produce high quality map layouts, complete with standard and advanced map elements (i.e., layouts, tables, charts, graphs, images, logos), which show cartographic excellence.
6. Develop mapping products in various output formats, including hardcopy and digital varieties.
7. Compare and contrast both 2D and 3D mapping visualizations.
8. Assess various map layouts for accurate and effective cartographic design principles.
9. Examine similarities and differences between GIS-produced mapping products and mapping products developed by other means (i.e., graphical design software).

IV. Course Content

A. Outline of Topics

1. Cartography Introduction
 - a. Brief history of cartography
 - b. Types of maps – Thematic versus reference
 - c. Principles, abstraction/generalization
 - d. Why maps constantly “lie”
 - e. Ethical considerations
 - f. Use of GIS for cartography
2. Spatial Parameters
 - a. Projection, coordinate system, datum, and unit of measure issues
 - b. Scale and orientation
 - c. Map and data accuracy
3. Map Data
 - a. Sources of data and information
 - b. Vector versus raster data inclusion
 - c. Level of data detail
 - d. Data overlaying considerations
4. Map Elements and Layout Design Considerations
 - a. Standard and advanced map elements and their uses
 - b. Spatial feature symbology
 - c. Color and color ramps
 - d. Patterns and hatching
 - e. Labels and annotation; fonts
 - f. White-space balancing
 - g. Map element placement
5. Media Formats and Considerations
 - a. Media and page sizing
 - b. Layout orientation
 - c. Printing considerations
 - d. Types of hardcopy display
 - e. Digital map distribution
6. Geovisualization Introduction
 - a. Forms of visualization
 - b. 2D versus 3D
 - c. Static versus dynamic
7. Web-based Map Design
 - a. Dynamic mapping environment

- b. Layout and scale
 - c. Access considerations
 - d. Desktop versus smart device applications
 - e. Story Maps
8. 3D Scenes and Animations
- a. Global versus local 3D scenes
 - b. Enhancing 3D effect in visualizations
 - c. Appropriate data considerations
 - d. Virtual fly-throughs
 - e. Temporal animations

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 cartography and geovisualization, 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 Cartography: A Guide to Effective Map Design, 3rd edition, 2020, Gretchen Peterson, ISBN 978-0367857943.

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: 10/3/2023