

COURSE OUTLINE

OXNARD COLLEGE

I. Course Identification and Justification:

- A. Proposed course id: GIS R106
Banner title: Introduction to GIS
Full title: Introduction to Geographic Information Systems and Techniques
- B. Reason(s) course is offered:
This course is designed to demonstrate interdisciplinary features in Geographic Information Systems (GIS) as they apply to the science and social science disciplines. This course is listed as Geography 155 in the Geography TMC.

II. Catalog Information:

- A. Units:
Current: 3.00
- B. Course Hours:
 - 1. In-Class Contact Hours:
Lecture: 35 Activity: 0 Lab: 52.5
 - 2. Total In-Class Contact Hours: 87.5
 - 3. Total Outside-of-Class Hours: 70
 - 4. Total Student Learning Hours: 157.5
- C. Prerequisites, Corequisites, Advisories, and Limitations on Enrollment:
 - 1. Prerequisites
Current:

Previous:
 - 2. Corequisites
Current:
 - 3. Advisories:
Current:
 - 4. Limitations on Enrollment:
Current:
- D. Catalog Description:
Current:
This course introduces students to computer-based GIS, Geographic Information Systems, and its applications to spatial data management as a tool to understand the world by describing and explaining the human relationship to the physical environment. Topics include assessment of vector and raster systems, scale, resolution, map projection, coordinate systems, georeferencing and Global Positioning Systems (GPS). Hands-on exposure to spatial analysis and modeling with GIS through the use of computers is provided during the laboratory. (same as GEOG R106)
- E. Fees:
Current: \$ None

- F. Field trips:
Current:
Will be required: []
May be required: [X]
Will not be required: []
- G. Repeatability:
Current:
A - Not designed as repeatable
- H. Credit basis:
Current:
Letter graded only [X]
Pass/no pass []
Student option []
- I. Credit by exam:
Current:
Petitions may be granted: []
Petitions will not be granted: [X]

III. Course Objectives:

Upon successful completion of this course, the student should be able to:

- A. Define Geographic Information Systems (GIS)
- B. Identify and evaluate GIS data sources and the importance of metadata
- C. Demonstrate the process of converting analogue data to digital data for use in a GIS
- D. Identify, compare and contrast vector and raster GIS
- E. Evaluate the capabilities of various GIS software programs
- F. Apply cartographic principles of scale, resolution, projection and data management to a problem of a geographic nature
- G. Apply spatial analysis functions on a GIS to solve a Geospatial problem
- H. Describe data storage, editing and retrieval techniques used in a GIS

IV. Course Content:

Topics to be covered include, but are not limited to:

- A. Overview of What GIS Is
 - 1. Definition of GIS
 - 2. Vector and raster systems
 - 3. Scale and resolution
 - 4. Map projections and coordinate systems
 - 5. Applications of GIS, its purpose and scope
 - 6. Basics of cartographic design
- B. Overview of What GIS Does
 - 1. Identify sources of GIS data and its spatial awareness and elements
 - 2. Metadata
 - 3. Georeferencing and Global Positioning Systems (GPS)
 - 4. Converting digital data to a uniform projection and scale
 - 5. Vector-to-raster and raster-to-vector data conversions, error propagation
- C. Designing and Implementing a GIS
 - 1. User needs assessment
 - 2. Database design and management
 - 3. Fundamentals of data storage

4. Database management
5. Input of data with GPS
6. Digitizing, scanning, editing and output
- D. Cartographic and GIS Data Structures
 1. Terms
 2. Computer file structures
 3. Computer database structures for managing data
 4. Graphic representation of entities and attributes
 5. GIS data models for multiple coverages
- E. Spatial Analysis
 1. Map algebra
 2. Buffering
 3. Interpolation and surface analysis
 4. Network analysis
 5. Applications in Decision-Making
 6. Modeling

V. Lab content:

- A. Introduce Fundamental Geographic Concepts
 1. Representation of the Earth
 2. Geographic coordinate system
 3. Map scale
- B. What is GIS, What Can It Do?
 1. Functional elements of a GIS
 2. Digital spatial data structures
- C. Introductory Training in the Use of ArcGIS Software
 1. Identifying, evaluating and inputting spatial data
 2. Developing and using raster and vector data sets
 3. Converting data from one form to another
- D. Applying Programming with GIS Software
- E. Data Visualization: Frames and Themes Within a Map
 1. Frame and layer properties
 2. New set, add to set, select from set
 3. Displaying tables, table properties
- F. Relational Database Management and Use
 1. Normalization
 2. Summarizing tables
 3. Joining and linking tables
- G. Uses of Important GIS Data Types
 1. Creating a slope and contour data from terrain data
 2. Downloading census data from the web and use in analysis
 3. Creating metadata

VI. Methods of Instruction:

Methods may include, but are not limited to:

- A. Lecture and demonstration including hands-on GIS software exercises that are practical applications of real-world scenarios.
- B. In-class discussion on data visualization: frames and themes within a map.

- C. In-class demonstration of ESRI's Arc View software capabilities and functionality in its power as a problem solving tool.
- D. In-class discussion and review of the online GIS-timeline project and development of GIS in various academic disciplines, such as geography, cartography, computer science, environmental science and anthropology.

VII. Methods of Evaluation and Assignments:

A. Methods of evaluation for degree-applicable courses:

Essays [X]

Problem-solving assignments (Examples: Math-like problems, diagnosis & repair) [X]

Physical skills demonstrations (Examples: Performing arts, equipment operation) [X]

For any course, if "Essays" above is not checked, explain why.

B. Typical graded assignments (methods of evaluation):

1. The data file includes demographic profiles of Ventura County for the census years 2000 and 2010. Use an appropriate GIS technique to show the areas that have gained population over the last decade. Redraw the map to represent the areas of population growth. Students will be evaluated on how they are able to manipulate data and effectively present a spatial analysis of population growth.
2. Short quizzes on topics such as uses of cartographic elements; how to construct simple SQL queries (Structured Query Language); how to understand maps and grasp quantitative information from them.
3. Students will be evaluated with an authentic assessment project (producing fire incident maps), and they will present their findings to their peers in a peer-reviewed format.

C. Typical outside of classroom assignments:

1. Reading
 - a. Reading assignments from the textbook as well as selected journal articles, such as from "Applied GIS", "American Journal of Geographic Information System", "GEOWorld", and "GIM International".
2. Writing
 - a. Essay assignment on what design issues should be kept in mind when making a choropleth map.
 - b. Review and analyze the GIS developed by the University of California, Santa Barbara on the Resource Management for the Channel Islands. Make a list of the data layers, and comment on which of them could be supplied from public-domain sources and which would require additional data entry or acquisition of new data sets.
3. Other
 - a. Out-of-class field preparation of GIS data, observation of a GIS mapping facility.
 - b. Utilize a quantile classification to divide the World's lakes by their surface elevation. Provide three classes: high, medium, low and label them in the table of contents appropriately. Provide a countries map as a background and use an appropriate color scheme for the lakes.

VIII. Textbooks and Instructional Materials:

A. Textbooks/Resources:

1. Law, Michael, Collins, Amy (2013). Getting to Know ArcGIS for Desktop for ArcGIS 10.1 (3rd/e). ESRI Press.
 2. "ArcGIS Desktop software." ESRI Press, 10.1 ed.
- B. Other instructional materials:
1. Instructor-developed PowerPoint

IX. Minimum Qualifications and Additional Certifications:

- A. Minimum Qualifications:
1. Geography (Masters Required)
- B. Additional Certifications:
1. Description of certification requirement:
 2. Name of statute, regulation, or licensing/certification organization requiring this certification:

X. Approval Dates

CC Approval Date: 11/25/15

Board Approval Date: 12/8/15

Course ID: 1815