GIS R106: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS

Originator
jdanza

College
Oxnard College

Discipline (CB01A)
GIS - Geographic Information Systems

Course Number (CB01B)
R106

Course Title (CB02)
Introduction to Geographic Information Systems

Banner/Short Title
Introduction to GIS

Credit Type
Credit

Start Term
Fall 2021

Co-listed (Same-as) Course(s)
GEOG R106

Taxonomy of Programs (TOP) Code (CB03)

2206.10 - *Geographic Information Systems

SAM Priority Code (CB09)

D - Possibly Occupational

Control Number

CCC000562202

Primary Minimum Qualification

GEOGRAPHY

Department

Geography (2214)

Division

Oxnard Math/Science/HED/Athletics/PE

Catalog Course Description
This course introduces students to computer-based mapping, Geographic Information Systems (GIS). Spatial data is used as a tool to understand the world by describing and explaining the human relationship to the physical environment. Topics include vector and raster systems, map design, scale, resolution, map projection, coordinate systems, geo-referencing and Global Positioning Systems (GPS). The laboratory provides applied, hands-on learning, using spatial analysis and modeling with GIS through the use of computers.

Taxonomy of Programs (TOP) Code (CB03)
2206.10 - *Geographic Information Systems

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
D - Possibly Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
Y - Credit Course

Funding Agency Category (CB23)
Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)
1 - Program Applicable

General Education Status (CB25)
Y - Not Applicable

Support Course Status (CB26)
N - Course is not a support course

Field trips
May be required

Faculty notes on field trips; include possible destinations or other pertinent information
Ventura County Government Center

Grading method
Letter Graded

Does this course require an instructional materials fee?
No

Repeatable for Credit
No

Is this course part of a family?
No

Units and Hours

Carnegie Unit Override
No

In-Class

Lecture
Minimum Contact/In-Class Lecture Hours
35
Maximum Contact/In-Class Lecture Hours
35

Activity

Laboratory
Minimum Contact/In-Class Laboratory Hours
52.5
Maximum Contact/In-Class Laboratory Hours
52.5

Total in-Class

Total in-Class
Total Minimum Contact/In-Class Hours
87.5
Total Maximum Contact/In-Class Hours
87.5

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class
Minimum Outside-of-Class Hours
70
Maximum Outside-of-Class Hours
70

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
157.5
Total Maximum Student Learning Hours
157.5

Minimum Units (CB07)
3
Maximum Units (CB06)
3

Student Learning Outcomes (CSLOs)

	Upon satisfactory completion of the course, students will be able to:
1	Use basic GIS tools and software to create a map with correct cartographic elements.
2	Locate, evaluate, and acquire geographical data from the Internet suitable for GIS analysis
3	Use basic GIS tools and software such as ESRI's ArcGIS Desktop to interpret and analyze geographic data
4	Define and explain key terms such as GIS, data models, file structures, map projections, geocoding and geodatabase

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1	Define Geographic Information Systems (GIS)
2	Identify and evaluate GIS data sources and the importance of metadata
3	Demonstrate the process of converting analogue data to digital data for use in a GIS
4	Identify, compare and contrast vector and raster GIS
5	Evaluate the capabilities of various GIS software programs
6	Apply cartographic principles of scale, resolution, projection and data management to a problem of a geographic nature
7	Apply spatial analysis functions on a GIS to solve a Geospatial problem
8	Describe data storage, editing and retrieval techniques used in a GIS

Course Content

Lecture/Course Content

1. Overview of What GIS Is
   a. Definition of GIS
   b. Vector and raster systems
   c. Scale and resolution
   d. Map projections and coordinate systems
   e. Applications of GIS, its purpose and scope
   f. Basics of cartographic design
2. Overview of What GIS Does
   a. Identify sources of GIS data and its spatial awareness and elements
   b. Metadata
   c. Georeferencing and Global Positioning Systems (GPS)
   d. Converting digital data to a uniform projection and scale
   e. Vector-to-raster and raster-to-vector data conversions, error propagation
3. Designing and Implementing a GIS
   a. User needs assessment
   b. Database design and management
   c. Fundamentals of data storage
   d. Database management
   e. Input of data with GPS
   f. Digitizing, scanning, editing and output
4. 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. GIS data models for multiple coverages
5. Spatial Analysis
   a. Map algebra
   b. Buffering
   c. Interpolation and surface analysis
   d. Network analysis

e. Applications in Decision-Making
f. Modeling

Laboratory or Activity Content

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

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises
Skills demonstrations
Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Essay exams
Essays
Group projects
Individual projects
Journals
Laboratory activities
Laboratory reports
Oral analysis/critiques
Objective exams
Oral presentations
Projects
Problem-Solving Assignments
Problem-solving exams
Quizzes
Reports/papers
Research papers
Skills demonstrations
Skill tests or practical examinations
Simulations

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations

Computer-aided presentations
Collaborative group work
Class activities
Class discussions
Case studies
Distance Education
Demonstrations
Field trips
Group discussions
Guest speakers
Instructor-guided interpretation and analysis
Instructor-guided use of technology
Internet research
Laboratory activities
Lecture
Practica
Small group activities

Describe specific examples of the methods the instructor will use:

1. Lecture and demonstration including hands-on GIS software exercises that are practical applications of real-world scenarios.
2. In-class discussion on data visualization: frames and themes within a map.
3. In-class demonstration of ESRI's Arc view software capabilities and functionality in its power as a problem solving tool.
4. 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.

Representative Course Assignments

Writing Assignments

1. Essay assignment on what design issues should be kept in mind when making a choropleth map.
2. 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.

Critical Thinking Assignments

1. Participate in class and small group discussions on how GIS can be used to solve real-world problems.
2. Create a method to analyze GIS data to perform a spatial analysis to solve a problem.
3. Determine relevant factors and use GIS capabilities to find the optimal location of a new urban development.
4. Determine methods to display spatial data that describes a phenomenon.

Reading Assignments

1. 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".

Skills Demonstrations

1. Input of geographic data using systems such as Global Positioning System (GPS).
2. Demonstrate the steps of converting analogue data to digital data for use in a GIS.
3. Demonstrate GIS software capabilities to create a map for use of analysis of a problem.
4. Create a map as a communication tool following good cartographic design and layout principles.

Other assignments (if applicable)

1. Field data collection for transfer to GIS.
2. Prepare a presentation summarizing a project from field data collection, to GIS analysis to final map product.

Outside Assignments

Representative Outside Assignments

1. Read textbooks or guides on map design and latest GIS technologies
2. Collect field data to map in GIS.
3. Coordinate data collection and GIS analysis from various disciplines on campus, other educational institutions, or agencies.

4. Review operations manual for various GIS software applications.
5. Collect GIS data from agencies or other educational institutions for projects.

Articulation

C-ID Descriptor Number
GEOG 155

Status
Approved

Comparable Courses within the VCCCD
GEOG V26 - Introduction to Geographic Information Systems Software
GIS V26 - Introduction to Geographic Information Systems Software

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type
Textbook

Description
Law, Michael, Collins, Amy (2018). *Getting to Know ArcGIS for Desktop for ArcGIS 10.1* (5th). ESRI Press, Redlands, CA

Resource Type
Software

Description
"ArcGIS Desktop Software." Version 10.1 ed.. ESRI Press, Redlands, CA

Resource Type
Other Instructional Materials

Description
Instructor-developed PowerPoint.

Distance Education Addendum

Definitions

Distance Education Modalities
Hybrid (51%–99% online)
Hybrid (1%–50% online)
100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.
Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.
Yes

Regular Effective/Substantive Contact

Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Synchronous Dialog (e.g., online chat)	Students post their results on a discussion board regarding their activity in the workbook or mapping system for comparison and further discussion with other students.
Asynchronous Dialog (e.g., discussion board)	Students will watch a video recorded by the instructor showing the software capabilities and process, and students follow on their software to complete the map activity.
Video Conferencing	Students will observe software usage performed by the instructor and complete the steps on their software.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Synchronous Dialog (e.g., online chat)	Students post their results on a discussion board regarding their activity in the workbook or mapping system for comparison and further discussion with other students.
Asynchronous Dialog (e.g., discussion board)	Students will watch a video recorded by the instructor showing the software capabilities and process, and students follow on their software to complete the map activity.
Video Conferencing	Students will observe software usage performed by the instructor and complete the steps on their software.

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Synchronous Dialog (e.g., online chat)	Students post their results on a discussion board regarding their activity in the workbook or mapping system for comparison and further discussion with other students.

Asynchronous Dialog (e.g., discussion board)	Students will watch a video recorded by the instructor showing the software capabilities and process, and students follow on their software to complete the map activity.
Video Conferencing	Students will observe software usage performed by the instructor and complete the steps on their software.

Examinations

Hybrid (1%–50% online) Modality
Online
On campus

Hybrid (51%–99% online) Modality
Online
On campus

Primary Minimum Qualification
GEOGRAPHY

Review and Approval Dates

Department Chair
09/02/2020

Dean
09/02/2020

Technical Review
09/09/2020

Curriculum Committee
09/09/2020

DTRW-I
01/14/2021

Curriculum Committee
11/25/2020

Board
01/19/2021

CCCCO
MM/DD/YYYY

Control Number
CCC000570362

DOE/accreditation approval date
MM/DD/YYYY