

NR 021: INTRODUCTION TO GIS

Originator

kleuschner

Justification / Rationale

Update course content, objectives, and textbook.
To submit for C-ID number GEOG 155.

Effective Term

Fall 2019

Credit Status

Credit - Degree Applicable

Subject

NR - Natural Resources

Course Number

021

Full Course Title

Introduction to GIS

Short Title

INTRO TO GIS

Discipline**Disciplines List**

Forestry/Natural Resources (Range management; soil, air and water resources; fish/wildlife management; parks and recreation)

Modality

Face-to-Face

Catalog Description

Geographic Information Systems (GIS) are software systems that allow users to integrate spatially related information from spreadsheets with smart mapping capabilities. In this course, students work with ESRI ArcGIS software to learn fundamental concepts of performing GIS tasks: identification and acquisition of GIS data; assessment of vector and raster systems, scale, resolution, map projection, coordinate systems; georeferencing and Global Positioning Systems (GPS); spatial analysis and modeling with GIS. Students will also learn how GIS technology can be applied to many fields including environmental research, government, business, real estate, health care, urban planning, fire technology, agriculture, landscape design, anthropology, and more.

Schedule Description

This course provides an overview of GIS (geographic information system) technology. Advisory: AIS 005

Lecture Units

2

Lecture Semester Hours

36

Lab Units

1

Lab Semester Hours

54

In-class Hours

90

Out-of-class Hours

72

Total Course Units

3

Total Semester Hours

162

Prerequisite Course(s)

Advisory: AIS 005

Required Text and Other Instructional Materials**Resource Type**

Book

Author

Clemmer, Gina

Title

The GIS 20 Essential Skills

Edition

3rd

City

Redlands, CA

Publisher

Environmental Systems Research Institute, Inc.

Year

2017

College Level

Yes

Flesch-Kincaid Level

12.

ISBN #

978-1-58948-512-9

Resource Type

Book

Open Educational Resource

No

Author

David Smith, Nathan Strout, Christian Harder, Steven Moore, Tim Ormsby, and Thomas Balstrom

Title

Understanding GIS; An ArcGIS Pro Project Workbook

Edition

Fourth

City

Redlands, California

Publisher

ESRI Press

Year

2017

College Level

Yes

ISBN #

978-1589485266

Class Size Maximum

24

Course Content

- A. What are Geographic Information Systems?
 - 1. How GIS is used across disciplines
 - 2. Integration of spreadsheet information with mapping capability
 - 3. Types of maps: thematic, categorical
 - 4. Looking at vector maps (points, lines, polygons) vs. raster maps
 - 5. Understanding types of data files: shapefiles and geodatabases
- B. ArcGIS Desktop and ArcGIS Pro
 - 1. Introduction to ArcGIS Desktop, ArcMap, ArcCatalog, ArcToolbox
 - 2. Interacting with maps: navigating, using basic tools
 - 3. Setting up a file structure
 - 4. Understanding attribute tables
 - 5. Assessing map data and adding data to a map
 - 6. Working with the Table of Contents and map layers
 - 7. Working with map scale
- C. Displaying and Presenting Data
 - 1. Introduction to coordinate systems and projections (GCS vs. PCS)
 - 2. Working with symbology
 - 3. Classifying features (graduated symbols and charts)
 - 4. Labeling features (dynamic labels and annotation)
 - 5. Designing a map layout
 - 6. Basic cartographic principles
- D. Creating and Editing Data
 - 1. Basics of geodatabases, creating feature classes
 - 2. Drawing, deleting, splitting, merging features
 - 3. Editing feature attribute values
 - 4. Geocoding addresses
- E. Querying data
 - 1. Using attributes queries
 - 2. Using location queries
 - 3. Joining and relating data
- F. Data Analysis
 - 1. Dissolving, clipping and buffering features
 - 2. Overlaying data
 - 3. Creating a data subset
 - 4. Using ModelBuilder
 - 5. Creating graphs

- G. Introduction to Spatial Analyst
 - 1. Creating and combining raster surfaces
 - 2. Analyzing raster surfaces
- H. ArcGIS Online
 - 1. Sharing ArcMap documents online
 - 2. Creating maps using ArcGIS Online
 - 3. Building online apps
 - 4. Creating story maps
 - 5. Working with Collector to map GPS points

Lab Content

Utilize GIS software in laboratory activities to meet objectives of course content. Laboratory activities include, but are not limited to: Plan, evaluate and execute a GIS project Identify a problem of a geospatial nature Outline a strategy to solve the problem Locate relevant data sources Design and evaluate a plan to acquire the relevant data sources Incorporate data sources into a Geographic Information System and execute strategy to solve a geospatial problem Apply principles of spatial analysis. Present results

Course Objectives

	Objectives
Objective 1	Define Geographic Information Systems (GIS) and identify how they are used to analyze spatially related data in a variety of disciplines. Understand the importance of metadata.
Objective 2	Interact with the two basic GIS data structures (raster and vector). Show how to convert analogue data to digital data.
Objective 3	Demonstrate how to use basic cartographic tools in designing a map layout such as projection, data management, scale, format, editing the map elements.
Objective 4	Explain uncertainty as it relates to coordinate systems, projection and map scale.
Objective 5	Use GIS to identify, query, and perform spatial analysis functions to solve problems.
Objective 6	Apply basic concepts used in ArcGIS database design.
Objective 7	Demonstrate competency with the ArcGIS software systems to enhance and interpret data.
Objective 8	Navigate the ArcGIS Online environment and competently use at least two online mapping tools.
Objective 9	Design and complete a GIS project from start to finish (data capture, data storage and management, analysis, and map presentation).

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Use the ESRI ArcGIS Desktop and Pro software to analyze and enhance spatially related data, and create an accurate map.
Outcome 2	Use the ESRI ArcGIS Online products to create online maps and interactive apps.
Outcome 3	Articulate how GIS can be used in scientific, business, and government applications.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Lecture	Instructor-led explanations of concepts.
Laboratory	Accurate completion of software tutorials.
Discussion	Class discussion with guest speakers.
Participation	Student-led explanations of concepts.
Experiential	Students design their own maps.
Demonstration, Repetition/Practice	Review quizzes requiring written responses.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Laboratory projects	Accurate completion of lab tutorials.	In Class Only
Presentations/student demonstration observations	Research and prepare a 10 minute presentation on a GIS concept.	Out of Class Only
Written homework	Weekly quizzes requiring short and essay answers.	Out of Class Only
Mid-term and final evaluations	Present a mid-term map project to the class and explain the steps that were taken to design the map.	In and Out of Class
Behavior assessment	Consistent participation and attendance in class. Helpful to other students.	In Class Only
Mid-term and final evaluations	Projects: design a maps from start to finish using an ArcGIS Online mapping tool. Present the project to the class. Demonstrate comprehension of data management, analysis, and project layout.	Out of Class Only
Written homework	Read and summarize articles about GIS use and mapping techniques.	Out of Class Only

Assignments
Other In-class Assignments

1. While completing the lab exercises, ask questions and offer to help other students when appropriate.
2. Complete additional exercises provided by the instructor.
3. Participate in class discussions and take notes on the lectures.
4. Engage with guest speakers by asking and answering questions, and offering helpful ideas.

Other Out-of-class Assignments

1. Students should expect to spend approximately 4 hours per week outside the class reviewing, reading, and preparing for mapping projects.
2. Review the PowerPoint lectures posted on Canvas.
3. Review videos posted on Canvas.
4. Review additional articles, ESRI periodicals, and websites provided by the instructor.
5. Research mapping techniques and data management concepts which will apply to the class projects. Share with the class.
5. Attend open lab hours when possible.

Grade Methods

Letter Grade Only

Comparable Transfer Course Information
University System

CSU

Campus

CSU San Bernardino

Course Number

GEOG 202

Course Title

Introduction to Geographic Information Systems

Catalog Year

2018-2019

Rationale

GEOG 202 offers a very similar introductory GIS curriculum.

University System

UC

Campus

UC Los Angeles

Course Number

GEOG 007

Course Title

Introduction to Geographic Information Systems

Catalog Year

2018-2018

Rationale

The course description matches the College of the Desert Introduction to Geographic Systems course description. The same topics are covered.

MIS Course Data**CIP Code**

03.0101 - Natural Resources/Conservation, General.

TOP Code

011500 - Natural Resources

SAM Code

D - Possibly Occupational

Basic Skills Status

Not Basic Skills

Prior College Level

Not applicable

Cooperative Work Experience

Not a Coop Course

Course Classification Status

Credit Course

Approved Special Class

Not special class

Noncredit Category

Not Applicable, Credit Course

Program Status

Program Applicable

Transfer Status

Transferable to both UC and CSU

Allow Audit

No

Repeatability

No

Materials Fee

No

Additional Fees?

No

Approvals**Curriculum Committee Approval Date**

3/21/2019

Academic Senate Approval Date

3/28/2019

Board of Trustees Approval Date

5/17/2019

Course Control Number

CCC000331879

Programs referencing this courseAnthropology AA-T Degree (<http://catalog.collegeofthedesert.eduundefined?key=14>)Geography AA-T Degree (<http://catalog.collegeofthedesert.eduundefined?key=15>)Desert Ecologist Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=150>)Field Ranger Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=151>)Agri-Business AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=46>)General Agriculture AS Degree (<http://catalog.collegeofthedesert.eduundefined?key=49>)Natural Resources AS Degree (employment preparation) (<http://catalog.collegeofthedesert.eduundefined?key=70>)Natural Resources AS Degree (transfer preparation) (<http://catalog.collegeofthedesert.eduundefined?key=71>)Agriculture Food Safety Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=83>)Agriculture Office Assistant Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=84>)Agriculture Office Professional Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=85>)Agriculture Pest Management Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=86>)Agriculture Technician Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=87>)Agriculture Irrigation Technician Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=91>)