



El Camino College

COURSE OUTLINE OF RECORD - Official

I. GENERAL COURSE INFORMATION

Subject and Number: Geography 8
Descriptive Title: Introduction to Geographic Information Systems

Course Disciplines: Geography

Division: Natural Sciences

Catalog Description: This computer-based course provides an introduction to the fundamentals of automated mapping and Geographic Information Systems (GIS) software. Laboratory work includes experience in the use of map scales, working with spatial data and metadata, creating data with Global Positioning System (GPS) and geocoding, map features, map overlays, creation of charts and graphs, basic spatial analysis techniques, and the presentation of data in map layouts.

Conditions of Enrollment: Recommended Preparation
Computer Information Systems 13 or
Basic computer skills

Course Length: Full Term Other (Specify number of weeks):
Hours Lecture: 3.00 hours per week TBA
Hours Laboratory: 3.00 hours per week TBA
Course Units: 4.00

Grading Method: Letter
Credit Status: Associate Degree Credit

Transfer CSU: Effective Date: 3/15/1999
Transfer UC: Effective Date: Fall 2009

General Education:

El Camino College: _____

CSU GE: _____

IGETC: _____

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for

each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. Students can identify the salient features of the basic concepts of physical geography. (This includes the ability to recall the definitions of the specialized vocabulary of physical geography.) (Identify, Recall → knowledge: learning outcome related to knowledge)
2. Students recognize and can accurately articulate how their environment affects humans' lives and how human activities affect their environment. (Recognize → valuing: learning outcome related to attitudes, behaviors, and values; articulate (explain) → comprehension: learning outcome related to knowledge)
3. As a part of the series of geography courses, we want students to understand how their environment affects their lives, and how their actions and their society's actions can affect the natural and cultural systems that sustain us all. SLO Statement: "Students recognize and can accurately articulate how their environment affects humans' lives and how human activities affect their environment. (Recognize → valuing: learning outcome related to attitudes, behaviors, and values; articulate (explain) → comprehension: learning outcome related to knowledge)
4. Our geography courses cover a wide range of introductory topics. At the end of our courses, students should be able to recognize, understand, and define the basic concepts of geography, and therefore are well-prepared to discuss environmental issues (e.g., climate change) and for advanced courses which ask them to apply this knowledge in specialized contexts. SLO Statement: "Students can identify the salient features of the basic concepts of geography. (This includes the ability to recall the definitions of the specialized vocabulary of geography.) (Identify, Recall → knowledge: learning outcome related to knowledge)

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at <http://www.elcamino.edu/academics/slo/>.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Compare and contrast conventional mapping technology to GIS automated technology.
Essay exams
2. Distinguish basic cartographic principles in map production.
Multiple Choice
3. Apply and use basic cartographic principles to produce maps.
Laboratory reports
4. Recognize and use basic map coordinate systems and map scales.
Laboratory reports
5. Formulate and interpret geographically referenced data.
Laboratory reports
6. Define problems associated with the acquisition and the accuracy of data used in GIS.
Objective Exams

7. Recognize the two basic GIS data structures (raster and vector).

Quizzes

8. Compare and contrast how the raster and vector data structures are manipulated.

Laboratory reports

9. Compare and contrast which data structure is best suited to a particular GIS application.

Quizzes

10. Overlay and produce maps combining the two basic GIS data structures.

Laboratory reports

11. Utilize basic concepts used in GIS database manipulation.

Laboratory reports

12. Use the basic functions of ArcGIS software to input data.

Laboratory reports

13. Define spatial analysis and explain how GIS can be used in scientific, business, and government applications.

Essay exams

14. Analyze and manipulate tabular data using ArcGIS.

Laboratory reports

15. Construct charts and graphs from analyzed tabular data using ArcGIS.

Presentation

16. Produce maps using the correct map coordinate system and map scales.

Presentation

17. Produce maps for use in interpreting geographically referenced data.

Presentation

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	3	I	I. History of Maps 1. Early Mapmaking 2. Computer Aided Mapping 3. Map making and Geographic Information Systems
Lecture	3	II	II. Survey of current GIS applications used in: 1. Science

			<ul style="list-style-type: none"> 2. Business 3. Government
Lecture	3	III	<p>III. Software and Hardware Requirements for GIS</p> <ul style="list-style-type: none"> 1. Applications and software specifications 2. Hardware requirements for various applications
Lecture	10	IV	<p>IV. Introduction to cartographic principles</p> <ul style="list-style-type: none"> 1. Map layout 2. Coordinate systems <ul style="list-style-type: none"> a. Longitude and latitude b. UTM c. State Plane 3. Map scales 4. Map projections
Lecture	3	V	<p>V. Comparison of manual and automated mapping techniques</p> <ul style="list-style-type: none"> 1. What constitutes a map 2. Advantages and disadvantages
Lecture	10	VI	<p>VI. Introduction to data structures</p> <ul style="list-style-type: none"> 1. Raster <ul style="list-style-type: none"> a. Grids b. Applications 2. Vector <ul style="list-style-type: none"> a. Points, lines, areas b. Applications
Lecture	9	VII	<p>VII. Define data requirements</p> <ul style="list-style-type: none"> 1. Metadata 2. Accuracy 3. Acquisition of data 4. Databases 5. Manipulation
Lab	10	VIII	<p>VIII. Spatial Analysis</p> <ul style="list-style-type: none"> 1. Working with spatial data 2. Single and multiple layer operations 3. Error propagation 4. Proximity 5. Terrain analysis 6. Buffers 7. Networks
Lecture	7	IX	<p>IX. Use of GIS in decision making</p> <ul style="list-style-type: none"> 1. Model versus real world 2. Advantages and problems 3. Applications of GIS and decision making
Lab	6	X	<p>X. Map Basics</p> <ul style="list-style-type: none"> 1. Making a hand drawn map 2. Types of maps 3. Scales 4. Coordinate systems 5. Projections
Lab	9	XI	<p>XI. Introduction to ArcGIS</p> <ul style="list-style-type: none"> 1. Map themes 2. Creating maps 3. Labeling and annotation maps 4. Adding tabular data to maps 5. Adding locations to maps as points 6. Charting your data

			<ul style="list-style-type: none"> 7. Creating shape files 8. Address geocoding 9. Choosing map projections
Lab	6	XII	<p>XII. Working with spatial data</p> <ul style="list-style-type: none"> 1. Finding, reading, interpreting, editing metadata 2. Measuring distance 3. Measuring area 4. Setting map projections 5. Changing scale of a view 6. Setting scale thresholds for themes
Lecture	6	XIII	<p>XIII. Managing tabular data</p> <ul style="list-style-type: none"> 1. Working with fields and records 2. Modifying and adding fields 3. Analyzing field and records
Lab	6	XIV	<p>XIV. Analyzing spatial relationships</p> <ul style="list-style-type: none"> 1. Querying data <ul style="list-style-type: none"> a. Finding the attributes of features b. Finding attributes with particular features c. Finding features near other features d. Finding features that all inside polygons e. Finding features that intersect other features
Lab	3	XV	<p>XV. Presentation information</p> <ul style="list-style-type: none"> 1. Creating charts 2. Creating graphs 3. Creating may layouts
Lab	3	XVI	<p>XVI. Creating your own data</p> <ul style="list-style-type: none"> 1. Creating themes from shape files 2. Editing shape files 3. Creating theme attributes
Lab	3	XVII	<p>XVII. Acquiring data</p> <ul style="list-style-type: none"> 1. Sharing or donation of data 2. Data from the Internet 3. Using purchased data 4. Data transformation
Lab	3	XVIII	<p>XVIII. Working with Raster data</p> <ul style="list-style-type: none"> 1. Data overlay 2. Buffering 3. Hill shade
Lab	5	XIX	<p>XIX. Mini Project</p> <ul style="list-style-type: none"> 1. Planning your project 2. Acquiring data 3. Cleaning up database 4. Creating a base map 5. Presentation of a project - maps, charts, graphs
Total Lecture Hours		54	
Total Laboratory Hours		54	
Total Hours		108	

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:

Skills demonstrations

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

In this exercise you will focus on skills needed to download data from the United States Census Bureau's Web sites and prepare the data for use in ArcGIS. You will download a United States Census Cartographic Boundary file of Florida counties as an ARC/INFO interchange (.e00) file. After downloading the .e00 file, you will transform it to an ARC/INFO coverage using the import function in ArcCatalog and finally transform it to a shapefile. The Cartographic Boundary files do not contain census data, so, in addition, you need to download a census data table of interest, prepare it for use in a GIS, and join it to the county boundary file. Finally, you symbolize a choropleth map.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. Using the ArcGIS software, generate a report that determines the best possible location of a new store given land availability, transportation routes, and residential characteristics.
2. Using the ArcGIS software, generate a report that creates a feature-based map of a volcanic area based on data of collected rock samples.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Essay exams

Objective Exams

Quizzes

Laboratory reports

Field work

Multiple Choice

Other (specify):

A final, semester-long research project that incorporates use of the scientific method. Students will conduct data collection/creation, spatial analysis, and generate a poster with maps for presentation.

Presentation

V. INSTRUCTIONAL METHODS

- Discussion
- Group Activities
- Guest Speakers
- Internet Presentation/Resources
- Laboratory
- Lecture
- Multimedia presentations
- Other (please specify)

Presentation of projects containing ArcGIS-created maps and relevant background research.

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

- Study
- Skill practice
- Required reading
- Written work

Estimated Independent Study Hours per Week: 6

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Tim Ormsby. Getting to Know ArcGIS Desktop, Updated for ArcGIS 10. 2nd ed. Esri Press, 2010.

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

D. OTHER REQUIRED MATERIALS

- Calculator
- Ruler

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification
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B. Requisite Skills

Requisite Skills

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification

Course Recommended Preparation or Computer Information Systems-13	
Non-Course Recommended Preparation Basic computer skills	More than half of this course relies on the use of computer-based mapping software. Basic computer literacy is needed for understanding hardware/software function, word processing, downloading data, installing programs, saving projects, managing files, troubleshooting simple errors, etc. A course such as Introduction to Computer Information Systems (CIS-13) would be recommended.

D. Recommended Skills

Recommended Skills
<p>Basic computer and word processing literacy. CIS 13 - Demonstrate the use of common application software such as Internet browsers, search engines, Word, Excel, Access and PowerPoint, and system software including operating systems, file management, system maintenance and security applications.</p> <p>CIS 13 - Demonstrate the effect of Boolean logic through the use of Access, Excel and other applications.</p> <p>CIS 13 - Identify and compare the hardware, features, and information systems of different computers and networks using common computer terminology, and knowledge of their appropriateness to various needs.</p>

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact

Course created by Matt Ebiner on 11/01/1998.

BOARD APPROVAL DATE: 03/15/1999

LAST BOARD APPROVAL DATE:

Last Reviewed and/or Revised by Julienne Gard on 09/10/2013