

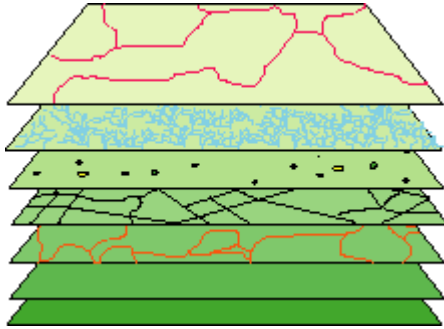
# Introduction to Geographic Information Systems (GIS)

**Instructor:** K. Allison Lenkeit Meezan  
**email:** meezankaren@fhda.edu

**Course times:** Tu 6-9:40PM  
**Course Location:** 4008  
**Office:** 3020 **Phone** (650) 949-7166

**Office Hours Fall 2010:** Tuesday 1-2PM & 4:30-5:30 (call ahead, I am often meeting with students in the KCI computer lab for the evening office hour). Thursday 9-9:50AM, and by appointment

**Class web site:** [www.foothill.fhda.edu/fac/klenkeit/courses.htm](http://www.foothill.fhda.edu/fac/klenkeit/courses.htm)



**Geographic Information Systems are smart maps. GIS integrate the display capabilities of a computerized map with the information management tools of a spreadsheet. This introductory course will focus on the fundamentals of operating in a GIS environment, and the many different applications of GIS technology. Lectures will be integrated with hands-on projects in which you will get to use several of the major GIS software products.**

This is an introductory level college course in Geographic Information Systems (GIS). It requires no prior experience with the subject. It is fully transferable (including UC and CSU).

**By the end of this course you should be able to do the following (Student Learning Objectives):**

1. Define Geographic Information Systems (GIS)
2. Identify, compare and contrast vector and raster GIS
3. List and evaluate the capabilities of various GIS programs.
4. Explain uncertainty as it relates to scale, resolution and projection; discuss uncertainty propagation within a GIS
5. Apply cartographic principles of scale, resolution, projection and data management to a problem of a geographic nature.
6. Apply spatial analysis functions on a GIS to a Geospatial problem.
7. Discuss the value and applications of GIS in three of the following fields: agriculture, biology, business and marketing, ecological modeling, economics, education, emergency management, epidemiology, facilities management, forestry, geography, geology, hydrological modeling, land use management, military, real estate, transportation, travel, urban planning, utility management, zoology.

## Prerequisites

There are no prerequisites for this course. Basic computer skills are strongly recommended.

## Texts

**Required:** *GIS Fundamentals: A First Text on Geographic Information Systems* Paul Bolstad, 3rd edition, Eider Press

## **Course Outline**

### **Unit 1: Fundamental Concepts in Geographic Information Science**

- \* Definition of GIS
- \* Vector and raster systems
- \* Scale, resolution, map projection
- \* Coordinate systems
- \* Applications of GIS

### **Unit 2: Geospatial Data**

- \* Georeferencing & Global Positioning Systems (GPS)
- \* Representing fields: raster, TIN, quadtrees, polygons
- \* Uncertainty propagation

### **Unit 3: Spatial Analysis**

- \* Quantitative & statistical methods; introduction to map algebra
- \* Formulating geographic questions
- \* GIS as a modeling tool

## **Required Materials**

Students will need to bring one USB memory stick to save work on (at least 256MB). We will be completing all labs on the KCI open lab computers which do not have any capacity to save your work. It is therefore critical that you come prepared with external media on which to save your work.

## **Logging into the ETUDES website**

Our class has a course management website. It includes copies of all lecture slides and class handouts, as well as a place to turn in homework and a chat room to post questions and discuss GIS with your classmates. To login, go to <https://myetudes.org/portal>

Directions for logging on can be found at <http://www.foothill.edu/fga/logininstructions.php>

## **Teaching Methods, Projects, Exams and Grading**

This course will incorporate a variety of teaching methods including class lectures, supplemental readings, lab-based activities, and one exam. You will be challenged to think critically and independently through a variety of methods including case study evaluation, data interpretation and analysis.

*Course grades will be determined using the following point values:*

Participation	100	1000-930 points:	A
Lab Projects	700	929-900 points:	A-
Homework & Reviews	50	899-870 points:	B+
Midterm Exam	150	869-830 points:	B
<b>Total Possible</b>	<b>1000</b>	829-800 points:	B-
		799-770 points:	C+
		769-700 points:	C
		699-600 points:	D
		Less than 600 points:	F

### **Class Participation**

The class participation portion of the grade is determined by attendance and participating in class discussions, and turning in occasional written summaries of articles handed out in class.

### **Lab Projects**

There will be four laboratory homework projects. Time will be dedicated in class to introduce the projects, but students will need to spend 1-2 hours per week outside of class working on the lab projects. Labs must be completed in the KCI computer lab. Labs 1-3 must be turned in via the ETUDES classroom. The lab writeup should be pasted into the java window, and the associated maps should be printed from the GIS software in PDF format and turned into ETUDES as attachments.

Please review the directions for turning in lab assignments posted in Module 1 in the ETUDES classroom. Please note that the ETUDES system will 'unformat' assignments turned in using the Safari browser on the Mac (it is not a supported browser). **Do not use the Safari browser** if you are using a Mac. Assignments that are not formatted correctly will be awarded a grade of zero.

The projects will involve applying GIS skills to prepared data sets in one of the following GIS programs: ArcGIS, GeoMedia, IDRISI. Projects 1, 2 & 3 are each worth 125 points. Project 4 is worth 325 points, 25 points for the project proposal, 200 points for the project report, 100 points for an oral presentation. Students will be encouraged but not required to work in pairs, however each student must turn in an original, individual lab write-up.

All assignments are due at the beginning of class on the posted due date. The oral presentation for Project 4 must be completed on the date specified on the class schedule below (no make-ups or late presentations). Assignments collected at the end of class are considered late and will be penalized. Late work is accepted up to four days after the due date, with a 10% penalty for each day late.

### **Homework & Reviews**

There are three 10 point homework assignments and two 10 point software review assignments. The homework assignments are brief exploratory assignments that require the student to spend 15-20 minutes researching a topic on the web then answering a few questions. The review assignments review common GIS functionality in different software products. These informal assignments must be turned in via the ETUDES virtual classroom.

### Class schedule & due dates

Class	Topic	Reading	Due
September 21	Intro to GIS & Cartography basics	Ch. 1	
September 28	History of GIS, vector and raster systems, tables and databases	Ch. 2 p. 25-50	Homework 1
October 5	Coordinate Systems & projections, map display & composition	Ch. 3, Ch 4 p. 159-168	Homework 2, Lab 1a
October 12	Metadata, Databases and queries, Survey of GIS software	Ch. 8 p. 291-307	Lab 1b
October 19	Georeferencing, Basic Spatial Analysis GPS, Networks	Ch. 5 & 9	Review 1 , Homework 3
October 26	<b>Midterm: 1 hour</b>	None	Lab 2
November 2	Raster Analysis, Representing topography and raster data, quantitative and statistical methods	Ch. 10 & 11	Review 2
November 9	GIS as a modeling tool, Formulating geographic questions, data quality & uncertainty, Legal issues	Ch. 12 & 14	Lab 3
November 16	The future of GIS, GIS project management	Ch. 15	Project proposal due to ETUDES by 11/16
November 23	No class, Thanksgiving week		
November 30	Work on final projects	None	
December 7	Final project oral presentations. Lab 4 due at the beginning of class.		

### Make-up policy

1. Make-ups are given only under the following circumstances: acute illness, extenuating circumstances which affect your performance in the classroom (e.g. family crisis, auto accident etc.)
2. All make-ups **must be scheduled on or before the day of the missed exam**. This means that you must contact me the day of the exam. Call, leave a voice mail message or email me. Please note that final project oral presentations may not be made up.

### Email and class messages

You are encouraged to email or send a message in the ETUDES class to your instructor if you have any questions. Expect a 24 hour response time for messages sent Monday through Friday morning. Messages sent over the weekend will be responded to within 72 hours.

### Attendance and withdrawal policy

You are responsible for all of the material presented in class. If you do not attend class for two weeks without contacting the instructor, you may be dropped. The withdrawal policy is in accordance to the official Foothill withdrawal policy <http://socrates.fhda.edu/reg/todrop.html>

### Plagiarism Policy

Plagiarism (see Foothill college definition of plagiarism at: <http://www.foothill.fhda.edu/news/honor.html>) on any assignment or exam in this course will result in an F on that assignment/exam for the first infraction, and an F for the course for subsequent infractions. All incidents of plagiarism will be reported to the Dean of Students.

### Disclaimer

The above schedules and procedures in this course are subject to change in the event of extenuating circumstances.