

## **Introduction to GIS for Anthropologists and Archaeologists**

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Lectures: Tuesdays 10:00am -10:50pm, ERCA 117

Lab: Tuesdays 9:30am – 9:59am, Thursday 9:30-10:50am

Office hours: by appointment, SSB 130

Prerequisites: upper-division standing

This course is an introduction to Geographic Information Systems (GIS) and spatial analysis for anthropologists and archaeologists and will provide students with basic skills in GIS that will serve as the foundation to more advanced use of GIS, which can be useful or even necessary in many fields. The course will also provide important background to GIS theory for use in social science contexts, allowing students to apply their skills accordingly. The course will consist of lectures providing a background of theory in GIS and supervised practical labs, which will give students hands-on experience with ArcGIS software. Lab activities will teach students the basic layout of ArcMap software, how to create and edit spatial data, create and edit attribute data, perform basic spatial analyses, and visualize their data, particularly in the form of high-quality and informative maps. Students will also learn to acquire freely-available spatial data from online resources. The course will culminate in a final project in which students will acquire data from online sources and develop their own project involving each of the skills learned and practiced in the lab assignments: creating/editing spatial data, creating/editing attribute data, at least one form of spatial analysis, and map creation. Labs in this course will use archaeological data as an example for how to use real social science data to produce real results. Students will be able to apply data relevant to their own fields or interests to the final project, which will be a cumulative student-driven project where students will apply multiple skills and approaches learned in the course.

### **Readings:**

Readings will be provided, please complete the reading prior to the lecture:

- Wheatley, D., and Gillings, M. 2002 *Spatial Technology and Archaeology: The Archaeological Applications of GIS*. Taylor and Francis, New York.
- Conolly, J., Lake, M., 2006. *Geographical Information Systems in Archaeology*. Cambridge.

### **Grading:**

One Exam on GIS Concepts and Theory: 25% of course grade

Seven Guided Lab Assignments: approx. 7% each for a total of 50% course grade

Final Project: 25% of course grade

### **Late Assignments:**

Late assignments will be docked 1% of the overall course grade (e.g. one day late is 7%-1%=6% possible full credit for that specific assignment) for each day they are late, up to a maximum of three days late, at which point they will receive a 0%. Keeping up with lab work is critical for this course, so if there is any issues that comes up that might cause a lab to be late, please speak to the instructor as soon as possible.

### **Labs:**

Each week of the class will have one lab project, which will be due by start of class on Tuesday on the following week. Labs will be demonstrated during class, and class time will also be allocated for completing the lab with the instructor available in case of any questions. Students will be responsible for

submitting each lab in a Word document with a map or maps displaying the result of their work and answering any questions that are part of the lab. Students can work together on labs but all submitted work must be their own.

### **Final Project:**

Students will be expected to develop a final project based on a theme of their own choosing. The project should include several of the skills learned in the labs during the course, including (but not limited to) downloading data, creating/editing spatial data, creating/editing attribute data, data manipulation, at least one form of spatial analysis, and map creation. Students should schedule a meeting with the instructor by Friday of Week 8 of the course in order to discuss their topic and have it approved. The final project will be due on Monday at 5:00 pm of finals week of the course in a poster explaining the project's goals and with at least three maps demonstrating the results of the project's analysis. Students will also present the results of their project in Week 10. Each student must have their own unique and independent topic for a final project. Students may collaborate for technical GIS work but must submit their own project.

### **Classroom Environment:**

Students are expected to not use their computers during lectures or lab demonstrations, beyond taking of notes. It is also expected that everyone in the classroom will treat others with respect and in good faith.

### **Academic Integrity:**

Students may work together on their labs and final projects, but each student must do all of the work for themselves. In other words, a student may help you figure something out, but you must actually do it yourself. Students suspected of misconduct will be referred to the Academic Integrity Office. Please feel free to ask if you are unclear about what would constitute an AI violation, and/or see <http://students.ucsd.edu/academics/academic-integrity/policy.html>.

### **Academic Support Services:**

If you require accommodations due to a disability, you must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD). Please present AFAs as soon as possible to allow time for appropriate planning for the provision of reasonable accommodations.

### **Course Schedule (subject to change):**

#### **Week 1 (03-OCT/05-OCT): Introduction to GIS for Anthropology and Archaeology**

*Tuesday Lecture:* Introduction to GIS, History of GIS, and Basic Theory

*Thursday Lab:* Introduction to GIS software and Functions, Displaying Data

*Assigned Reading:* Conolly and Lake pages 11-16, 24-31; Wheatley and Gillings pages 1-3, Section 1.5, 1.6, 1.8

#### **Week 2 (10-OCT/12-OCT): Coordinate Systems, Map Projections, and Cartography**

*Tuesday Lecture:* Coordinate Systems and Map Projections. Cartographic Goals and Principles.

*Thursday Lab:* Understanding Coordinate Systems, Modifying Symbology and Making Maps

*Assigned Reading:* Conolly and Lake pages 16-24, 263-265; Wheatley and Gillings section 2.3

**Week 3 (17-OCT/19-OCT): Spatial Databases**

*Tuesday Lecture:* What is Spatial Data? What are Spatial Databases and what types are there?

*Thursday Lab:* Creating shapefiles and geodatabases, Attribute Tables, editing features, vector digitization

*Assigned Reading:* Conolly and Lake pages 51-57; Wheatley and Gillings section 2.0, 2.1

**Week 4 (24-OCT/26-OCT): Test and Editing Data**

*Tuesday Lab:* Joins and Relates, Attribute and Spatial Queries

*Thursday:* **EXAM**

*Assigned Reading:* Conolly and Lake pages 112-122; Wheatley and Gillings pages 79-83

**Week 5 (31-OCT/02-NOV): Data Sources**

*Tuesday Lecture:* Data Capture in the Field and Data Sources online

*Thursday Lab:* Downloading Data, Georeferencing raster data, vector data digitization

*Assigned Reading:* Conolly and Lake Chapter 5, pages 86-89

**Week 6 (07-NOV/09-NOV): Manipulating Data**

*Tuesday Lecture:* Spatial Analysis: Introduction to complex Data Manipulation

*Thursday Lab:* DEM/TIN production, Contour production, raster calculator

*Assigned Reading:* Conolly and Lake pages 90-91 and read the descriptions for inverse distance weighting, splines, kriging, Section 6.6.0; Wheatley and Gillings pages 95-100

**Week 7 (14-NOV/16-NOV): Advanced Spatial Analysis**

*Tuesday Lecture:* Spatial Analysis Theory Case Study (Viewshed or Cost Path Analysis)

*Thursday Lab:* Spatial Analysis (Instructor available remotely on ZOOM)

*Assigned Reading:* Conolly and Lake Chapter 10; Wheatley and Gillings Chapter 10

**Week 8 (21-NOV/23-NOV): Theory for Anthropological GIS Applications**

*Tuesday Lecture (REMOTE ZOOM):* Theory for Anthropological GIS Applications

*Thursday Lab:* Begin searching for data for Final Projects, Final Project Proposals due Week 9

*Assigned Reading:* Review Conolly and Lake and Wheatley and Gillings for material relevant to your final project

**Week 9 (28-NOV/30-NOV): Final Project Consultation/Approval**

*Tuesday:* In Lieu of Lecture, students will meet individually with instructor to consult on their Final Project Proposals and Receive Approval

*Thursday Lab:* Final Project

*Assigned Reading:* Review Conolly and Lake and Wheatley and Gillings for material relevant to your final project

**Week 10 (05-DEC/07-DEC): Final Project Presentations**

*Tuesday:* Student Presentations

*Thursday:* Student Presentations

*Assigned Reading:* Review Conolly and Lake and Wheatley and Gillings for material relevant to your final project

**Final Project Poster due Monday of Finals week by 5:00pm**