

Course Syllabus

Environmental GIS (2005)

Course Objective: To provide an understanding of the basic concepts and uses of GIS technology and spatial analysis.

Course Description: Geographic Information Science (GIS) is the science of linking data to locations to explore spatial relationships. GIS is way more than just maps! By evaluating the relationship between different spatial information you can identify the best location for new development, locate pollution point sources, find the easiest way to get from point A to point B, and develop a better understanding of the way the world interacts around us. In this class, you will learn basic GIS concepts such as spatial data structures, sources and transfer methods, projections and coordinate systems, georeferencing, issues of accuracy, metadata, supporting software, global positioning systems, and the integration of remote sensing and GIS. Laboratory exercises will focus on learning how to use GIS software products created by ESRI, Inc. (ArcGIS 9) to examine, create, manipulate and analyze geospatial data. The culmination of the course is the presentation of an original research project employing the methods learned.

Prerequisites: You should have a general knowledge and familiarity with personal computers, computer terminology, and the Windows XP operating system. You are strongly encouraged to engage the assistance of a professor within their respective department to assist in guiding their research project.

Course Assessment:

Lab Reports

During your lab period one week after the lab is handed out
20% of grade

Proficiency Examination

20% of grade

Oral presentation (5-10 min) write-up (3-5 pages) of a journal article on a GIS application

10% of grade (5% for oral presentation, 5% for write-up)

Research Project

Proposal Abstract (up to 1 page) **Due Date:**

Introduction and Background (2 pages) **Due Date:**

5% of grade

Materials and Methods (2 pages) **Due Date:**

5% of grade

Oral Presentations (12-15 min) **Due Dates:**

10% of grade

Final Report (7-10 pages plus figures) **Due Date:**

15% of grade

Final Report Poster **Due Date:**

10% of grade

Class Participation

Attendance to class and labs and engagement in the material

5% of grade

Late Policy

A deduction of 5 points per day will be made on assignments handed in after the due date.

Text:

GIS Concepts and ArcGIS Methods. David M. Theobald. Conservation Planning Technologies, 2003

Any additional reading materials will be provided

Other Materials:

Students may need/wish to have cd-rws, zip disks, and/or a usb memory device for file backup and transfers.

Syllabus:

Week 1

Lecture 1

Introduction and course overview. Examples of GIS Applications

Reading: *Introduction to GIS p. 1-27*

Lecture 2

The importance of spatial relationships. Why we use GIS science

Week 2

Lecture 3

Defining GIS: Components of ESRI software programs and terminology

Reading: *Visualization of Spatial Data p. 91-129*

Lab 1

The Basics of ArcCatalog and ArcMap

Reading: *Data models p. 29-54 and Raster basics p. 187-199*

Week 3

Lecture 4

Spatial data structures: Raster vs. Vector data

Reading: *Querying a map p. 135-149*

Lab 2

Working with tables, queries, and basic geoprocessing tools in ArcMap and ArcToolBox

Reading: *Coordinate systems p. 69-89*

Week 4

Lecture 5

Map Concepts of Scale, Projections and Coordinate Systems

Lab 3

Coordinate Systems, Map Projections and Georeferencing in ArcMap and ArcCatalog

Week 5

Lecture 6

Spatial Analysis

Lab 4

The Spatial Analyst Extension

Research Proposal Abstracts Due

Reading: Creating and editing p. 151-172

Week 6

Lecture 7

Data sources and data collection – where to get data and how to create your own

Lab 5

Creating and Editing new spatial data files in ArcMap and ArcPad (the latter is weather dependent)

Week 7

Lecture 8

Spatial data in three dimensions: Modeling surfaces

Introduction and Background Due

Lab 6

Surface analysis and Geostatistical Analyst in ArcMap

Proficiency Exam Handed Out

Week 8

Lecture 9

Remote Sensing and GIS: Complementary thinking

Lecture 10

Metadata and designing databases

Proficiency Exam Due

Week 9

Lecture 11

Applications in GIS

Lab 7

Work on research projects

Week 10

Lecture 12

Cartographic Design: Using GIS Layouts to create an effective poster and/or powerpoint presentation

Materials and Methods Due

Lab 8

Work on research projects

Week 11

Oral Presentations

GIS Applications

Oral Presentations

GIS Applications

3-5 Page write-up of Article describing a GIS Application Due

Week 12

Project Presentations

Week 13

Final Report and Poster Due