

## **GEOG 4550 - Advanced GIS**

Fall, 2009. Wednesday 6:00 - 8:50 PM, EESAT 125

**(This syllabus is for undergraduates only. See GEOG 5550 for graduate syllabus)**

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### **Prerequisites**

GEOG 4500 “Introduction to GIS” and GEOG 4520 “Intermediate GIS” (or consent of department).

### **Objectives**

This course is built on GEOG 4500 “Introduction to GIS” and GEOG 4520 “Intermediate GIS”. Some advanced GIS topics are introduced through a combination of lectures, hands-on exercises, ESRI Virtual Campus Tutorials, and individual projects. The course objectives are the following:

- (1) Learn about the new features of ArcGIS and general practices of GIS project design;
- (2) Develop a deeper understanding of raster/vector data structure and manipulation;
- (3) Learn how to create, edit, and manage geodatabases;
- (4) Design geoprocessing models using ModelBuilder to solve application problems;
- (5) Learn how to create Web-based GIS applications using ArcIMS;
- (6) Learn about some advanced topics in spatial analysis.

### **Reference Books:**

Digital versions of the following books are available in the folder R:\CSAM\class\4550\Readings. Please DO NOT print the books in the CSAM labs.

[1] Zeiler, M. 1999. Modeling Our World: The ESRI Guide to Geodatabase Design. ESRI. ISBN 1-879102-625.

[2] MacDonald, A. 2001. Building a Geodatabase. ESRI. ISBN 1-879102-99-4.

### **Lab and Homework**

Each class has an instruction session followed by an in-class lab session. Lab handouts and data are available at **R:\CSAM\class\4550\Labs**. Three individual homework assignments (15% each) will be turned in and marked. Late homework will be marked down 10% for every day late. Homework handouts and data are available at **R:\CSAM\class\4550\Homework**.

### **Required Online Tutorials** (Passcodes will be provided in the class)

- (1) ESRI Virtual Campus Tutorial: “Creating, Editing, and Managing Geodatabases for ArcGIS 9”. (Online test results due **December 17**)
- (2) ESRI Virtual Campus Tutorial: “Learning ArcIMS”. (Online test results due **December 17**)

## Project

Students are required to complete individual projects in an area of GIS applications. The project should focus on a specific problem and geographic area. A project plan of 2-4 single-spaced pages should be submitted (saved to R:\) on **September 23**. Students may need to modify their project plans based on feedback from the instructor. Samples of previous student projects are available at <http://www.geog.unt.edu/~pdong/AdvancedGIS.htm>. A final project report of 8-15 single-spaced pages in **PDF format** should be submitted (saved to R:\) **on or before December 17**. Detailed requirements of the project will be distributed in class.

## Schedule

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Assignments</b>
2	09/02	<b>What's New in ArcGIS?</b> (lecture & in-class exercise)	1) Explore project ideas and data. 2) Review literature for your project.
3	09/09	<b>GIS Project Design</b> (lecture & in-class exercise)	1) Explore project ideas and data. 2) Review literature for your project.
4	09/16	<b>Vector Data Structure and Manipulation</b> (lecture & in-class exercise → Homework 1)	1) Explore project ideas and data. 2) Work on Homework 1 (due 10/07). 3) Work on your project plan.
5	09/23	<b>Work on your project ideas and submit project plan.</b>	1) Read sample project reports; 2) Explore project ideas; 3) <b>Submit your project plan</b> (2-4 pages, single-spaced);
6	09/30	<b>Raster Data Structure and Manipulation</b> (lecture & in-class exercise)	1) Work on your project.
7	10/07	<b>Topology and Geometrical Operators</b> (lecture & in-class exercise)	1) <b>Submit Homework 1.</b> 2) Modify your project plan if needed.
8	10/14	<b>ArcIMS for Internet Mapping (1)</b> (lecture & in-class exercise)	1) Work on your tutorial and project. 2) Start working on ArcIMS Tutorial. Online test results due 12/17.
9	10/21	<b>ArcIMS for Internet Mapping (2)</b> (lecture & in-class exercise)	1) Work on ArcIMS using your data. 2) Work on your tutorials and project.
10	10/28	<b>Building Geodatabases</b> (lecture & in-class exercise)	1) Start working on geodatabase tutorial; Online test results due 12/17. 2) Work on your project.
11	11/04	<b>Designing Geoprocessing Models</b> (lecture & in-class exercise → Homework 2)	1) Work on Homework 2 (due 11/18). 2) Work on your tutorial and project.
12	11/11	<b>Uncertainty and Accuracy in GIS</b> (lecture & in-class exercise → Homework 3)	1) Work on Homework 3 (due 11/25). 2) Work on your tutorial and project.
13	11/18	<b>Scale and Spatial Heterogeneity in GIS</b> (lecture & in-class exercise)	1) <b>Submit Homework 2.</b> 2) Work on your tutorials and project.
14	11/25	<b>(Project Week)</b> Work on your project in the labs. The instructor will be there to help you.	1) <b>Submit Homework 3.</b> 2) Work on your tutorials and project. 3) Start working on final project report.
15	12/02	<b>Voronoi Diagrams in GIS</b> (lecture & in-class exercise)	Work on your tutorials and project.
16	12/09	<b>(Pre-Final Week)</b>	Work on your tutorials and project.
17	12/16	<b>(Final Week. No class. Finish your projects and online tests)</b>	1) <b>Submit Geodatabase online test results</b> on or before 12/17; 2) <b>Submit ArcIMS online test results</b> on or before 12/17. 3) <b>Submit final reports</b> on or before 12/17.

## **Deliverables**

- (1) Three homework assignments (refer to schedule for due dates);
- (2) One Project Plan (2-4 single-spaced pages. **Due September 23**);
- (3) Two ESRI online tutorial certificates (Geodatabase and ArcIMS. **Due December 17**);
- (4) One Final Project Report (Single-spaced PDF file, see project template for format. **Due December 17**).

**Grading Structure** (90-100: A, 80-89: B, 70-79: C, 60-69: D, 0-59: F)

	<b>Undergraduates</b>	<b>Graduates</b>
Homework Assignments	45%	30%
ESRI Geodatabase Online Test	15%	10%
ESRI ArcIMS Online Test	15%	10%
Project Report	25%	50%

## **Academic Dishonesty**

Students caught cheating or plagiarizing will receive a "0" for that particular assignment or exam. Additionally, the incident will be reported to the Office of Student Rights and Responsibilities for further penalty. According to the UNT catalog, the term "cheating" includes, but is not limited to:

- a. Use of any unauthorized assistance in taking quizzes, tests, or examinations;
- b. Dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
- c. The acquisition, without permission, of tests or other academic material belonging to a faculty or staff member of the university;
- d. Dual submission of a paper or project, or resubmission of a paper or project to a different class without express permission from the instructor(s); or
- e. Any other act designed to give a student an unfair advantage.

The term "plagiarism" includes, but is not limited to:

- a. The knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment; and
- b. The knowing or negligent unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

## **Accommodations**

The Department of Geography, in cooperation with the Office of Disability Accommodation, complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request before the 12<sup>th</sup> class day.

## **Extra Credit**

The Department of Geography does not allow extra credit assignments (work not specified on a course syllabus).

## **Classroom Courtesy**

Please follow these guidelines to avoid disrupting the class:

- a. Turn off cell phones before arriving;
- b. Do not arrive late or leave early (except for a bathroom break or emergency);
- c. Do not sleep during class;
- d. Do not work on other assignments during class;
- e. Do not talk or whisper to neighbors (except for formal class interaction).