

# **GEOG 4550 - Advanced GIS**

Fall, 2016. Mondays 6:00 – 8:50 PM, ENV 336

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

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Office Hours: Mondays 8:00 – 9:30 AM, Thursdays 8:00 – 9:30 AM, or by appointment.

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## **Prerequisites**

GEOG 3500 “Introduction to GIS” and GEOG 4520 “Intermediate GIS” (or consent of department).

## **Objectives**

This course is built on GEOG 3500 “Introduction to GIS” and GEOG 4520 “Intermediate GIS”. Some advanced GIS topics are introduced through a combination of lectures, hands-on exercises, ESRI training courses, 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) Develop skills in LiDAR data processing and analysis;
- (4) Learn about some advanced topics in 3D analysis, spatial analysis, and modeling.

## **Reference Materials:**

Research papers and short articles will be provided in digital form. Please **DO NOT** print the papers in the CSAM labs.

## **Labs and Homework**

Each class has an instruction session followed by a lab session. Two individual homework assignments (Homework 1 and Homework 2) will be turned in and marked. Late homework will be marked down 10% for every day late. Lab/homework documents and data are available at R:\class\4550\.

## **Project**

In addition to labs and homework assignments, students are required to complete an individual course project on GIS applications in a specific geographic area. A project plan (Word document) of 1-3 single-spaced pages should be submitted (saved to R:\). Students may need to modify their project plans based on the feedback from the instructor. A course project report of **6-12 single-spaced pages in PDF format** should be submitted (saved to R:\). Detailed requirements of the project will be distributed in class.

## **ESRI Training Courses** (Passcodes will be provided in class)

- (1) 3D Visualization Techniques Using ArcGIS. (3 hours)
- (2) Exploring Spatial Patterns in Your Data Using ArcGIS (**optional**). (3 hours)
- (3) Managing Lidar Data in ArcGIS 10. (3 hours).
- (4) Managing Lidar Data Using LAS Datasets. (2 hours)

## Schedule

Week	Date	Topic	Assignments
1	08/29	What's New in GIS?	1) Lab 1. 2) Read "What is the geographic approach?"
2	09/05	Labor Day (no class)	
3	09/12	GIS Project Design	1) Lab 2. 2) Explore course project ideas and data. 3) <b>Start working on ESRI certificates.</b>
4	09/19	Vector Data Structure and Manipulation	1) Lab 3. 2) Explore course project ideas and data.
5	09/26	Raster Data Structure and Manipulation	1) Lab 4. 2) Explore course project ideas and data.
6	10/03	Working with LiDAR Point Clouds	1) Lab 5. 2) <b>Start working on Homework 1.</b> 3) Explore course project ideas and data.
7	10/10	Uncertainty and Accuracy in GIS	1) Lab 6. 2) <b>Submit course project plan.</b>
8	10/17	3D Urban Models – Visualization and Applications	1) Lab 7. 2) Read research article.
9	10/24	Digital Elevation Models and Environmental Modeling	1) Lab 8. 2) <b>Submit Homework 1.</b> 3) <b>Start working on Homework 2.</b>
10	10/31	Voronoi Diagrams in GIS (lab 6)	1) Lab 9. 2) Read research article.
11	11/07	Volunteered Geographic Information	1) Lab 10. 2) Read research article.
12	11/14	GIS Apps for iPhone	3) Lab 11. 4) Read research article.
13	11/21	Project Week	1) Work on course project. 2) <b>Submit Homework 2.</b>
14	11/28	Undergraduate Project Presentations	10-minute presentation followed by 5-minute Q&A.
15	12/05	Graduate Project Presentations	15-minute presentation followed by 5-minute Q&A.
16	12/12	Final Week – Work on your final project.	1) <b>Submit ESRI certificates (3) on 12/12.</b> 2) <b>Submit final project report on 12/12.</b>

**Deliverables** (refer to schedule for due dates)

- (1) Course project plan (**Word document**).
- (2) Homework 1 and Homework 2 (**Word documents**).
- (3) Three ESRI training course certificates (**PDF documents**).
- (4) Course project report (**Single-spaced PDF document, 6-12 pages**).

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

Items	Undergraduates	Graduates
Attendance and Labs	8%	8%
Homework 1 and Homework 2	32%	30%
ESRI Training Course Certificates	30% (3 certificates)	32% (4 certificates)
Project Presentation and Project Report	30%	30%

## **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 University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the Office of Disability Accommodation website at <http://www.unt.edu/oda>. You may also contact them by phone at 940.565.4323.

## **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).

## **Course Evaluation**

Students will receive an email with a link to the UNT Student Perceptions of Teaching (SPOT) Course Evaluation by the end of the semester.