Dept. of Civil and Env Engineering
Dept of Urban Affairs and Planning
Fall Semester 2007

CEE 5204 GIS Applications in Civil Engineering
UAP 5114 Computer Applciations in Planning
Tuesday 4:00-6:45 1021 Prince St. Computer Lab

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Office hours: **By appointment**

COURSE DESCRIPTION:

This course will prepare students to use geospatial information and analyses to solve engineering and planning problems. Basic GIS concepts in geospatial data structures, geodetic datums, map projections and coordinate systems, databases, topology, spatial queries/analysis, digital elevation models, engineering and planning applications, and cartography and digital mapping will be presented. It will include learning and using state of the art software including ArcGIS v9.2 as well as other software. The course is not intended to "fill your mind", rather, it is intended to "open the door" to help you help yourself learn more about the topic, especially as applied to civil and environmental engineering and planning applications.

TEXTS/RESOURCES:

Required:

1. Getting to Know ArcGIS Desktop, ISBN 1-58948-083-X, ESRI Press, Tim Ormsby et al., 2004. (*GTKAG*)

Recommended:

2. GIS Concepts and ArcGIS Methods, ISBN 0-9679208-2-5, Conservation Planning Technologies (www.consplan.com), David Theobald, 2003. (*Theobald*)

Available Software:

3. A 6-month license of Arcview 9 is included with the ArcGIS text. A 1-year license of ArcGIS 9.2 is available to enrolled students from Campus Software. ArcInfo level of ArcGIS 9.2 is available in the GIS lab in Alexandria and the Cyber Lounge, NVC in Falls Church.

Website:

4. http://learn.vt.edu for Blackboard

GRADING:

Your final grade will be determined as follows:

2 Group Projects	30%
Presentation of second project	5%
Assignments / In-Class Projects	30%
2 Exams	35%
TOTAL	100%

a. CLASS PARTICIPATION: This course is designed to encourage active participation of everyone in class.

b. GROUP PROJECTS and PRESENTATION: You are required to work in groups of two or three. Grades will be based on your (1) ability to complete the assigned project using geospatial analysis techniques, and (2) clarity of both written, cartographic, and oral presentations. The final project will include an oral presentation. The same grade will be assigned to each member of the group.

c. ASSIGNMENTS / IN-CLASS PROJECTS: Assignments will be assigned during class to be turned in before the following class by the time specified in the memo. These are specific to the topic(s) presented that week. Grades will be based on (1) demonstrated effective use of geospatial techniques and analyses and (2) written and geospatial presentation skills. In-class projects may be assigned at any time during class and are due before the end of that class.

d. EXAMS: Exams are a measure of your understanding of geospatial concepts and mastery of geospatial analysis. The first exam is a closed-book exam with questions about geospatial concepts, data, and data models: taken in class and worth 10%. The second exam is a take-home project-based exam, due at the beginning of the next class. It will consist of a series of geospatial analysis problems and is worth 25%. Grades will be based on completeness, practicality, implementability, and presentation, as well as a demonstrated understanding of limitations of the software and analysis techniques. For the take-home section, you may use any non-living resources that you have acquired or identified.

Note that homework and projects will only be credited when handed in ON TIME! Late assignments will be graded with a substantial penalty unless a proven emergency occurs. All assignments should be done using a word processer and, if possible, coverted to a pdf file and submitted electronically as a **single** file using the DropBox in Blackboard. Quizzes may be given at any time without makeup. As always, the VT Honor Code System applies: (Grad: http://www.cs.vt.edu/gpc/gradhc.html)

TENTATIVE SCHEDULE:

Week	Topics	Reading
1	Introduction: Syllabus, Course website, Introduction to GIS Concepts, Cartographic concepts, Map Elements & Issues, Intro to ArcGIS Desktop	*GTKAG* Ch 1-5, 7 *(Theobald** Ch 1)
2	Geospatial Data and Data Models: Data Structures, Raster vs Vector, Accuracy & Precision, Coordinate Systems and Projections, State Plane Coordinates, PLSS, Geodesy	*GTKAG* Ch 11, 13 *(Theobald* Ch 2 & 3)
3	Geospatial Data and Data Models: Geodatabases, Creating and editing feature data. Topology, Cleanup, simplification, GPS, Digitizing, Georeferencing	*GTKAG* Ch 14-17 *(Theobald* Ch 6)
4	Geospatial Data and Data Models: Relational database design, geodatabase design, joining & relating tables	Handout GTKAG- Ch 9
5	Geospatial Data and Data Models: Metadata, Standards, Data sources, Imagery **Exam 1, in-class September 18**	Website
6	Geospatial Analysis: Querying data, , Locational queries, Classification, **Project 1 due**	*GTKAG* Ch 6, 8, 10 *(Theobald* Ch 4 & 5)
7	Geospatial Analysis: Single layer analysis, Buffering	*GTKAG* Ch 12 *(Theobald* Ch 8)
8	Geospatial Analysis: Mutliple layer analysis, Overlays	*GTKAG* Ch 12 *(Theobald* Ch 9)
9	Geospatial Analysis: Raster Basics and Analysis, Grid Analysis	*(Theobald* Ch 7)
10	Geospatial Analysis: Network Analysis, Dynamic Segmentation	Website
11	Geospatial Analysis: Terrain modeling, TINs and DEMs	Website
12	Geospatial Analysis: **Exam 2–November 6, Due November 11**	*GTKAG* Ch 8 *(Theobald* Ch 9)
13	Geospatial Analysis: ArcScene, GoogleEarth	Website
	Thanksgiving	
14	Project	
15	**Project 2 due**, Project Presentations	

**Theobald* is recommended reading if students require additional reference material