

## ***Urban Affairs and Planning: Computer Applications (GIS)***

UAP 5114, Fall 2007

Monday 4:15 to 6:45 PM, 2<sup>nd</sup> Floor Computer Lab (1021 Prince St., Alexandria)

### **Contact Information**

Instructor: Kris Wernstedt  
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Office Hours: By appointment only (please!!)

### **Course Objectives**

This course covers how practicing planners, policy analysts, and researchers in planning and other disciplines can use geographic information systems (GIS) to answer questions and solve problems encountered in work. More specifically, the course aims to expose students through lectures, readings, student presentations, and hands-on exercises to:

- the basic concepts, structures, and functions of geographic information systems;
- the use of GIS to help articulate and define planning and policy-related problems and to evaluate alternative options for addressing these problems;
- framing and addressing spatial research questions using GIS, including the generation of hypotheses, collection of data, and analysis; and
- communication of the process and results of GIS analyses, in graphical, textual, and oral forms.

The course uses the ArcGIS software to meet these objectives.

### **Learning Objectives**

By the end of the class, the student will:

- Demonstrate understanding of basic concepts of GIS design and structure including fundamentals of cartography and spatial thinking, GIS data structures, base files, measurement, input, storage, editing, output, and display;
- Demonstrate understanding of the concepts and application of spatial measurement, classification, and analysis; and
- Demonstrate the ability to apply GIS concepts and methods to answer a spatial planning, policy analysis, or other research question.

### **Course Format**

The class includes lectures, discussion, and in-class and online computer lab work. The first part of each week's meeting generally will include lecture and discussion and the second part will involve student work and discussion. Lab demonstration sessions are intended to introduce and demonstrate GIS concepts and applications. **You will need to spend additional lab time outside class to complete the work.**

Please arrive for class on time and do not disrupt the formal lecture and discussion portions of the class by getting up and leaving unless it is absolutely essential. If you must arrive late or depart early, please do so with minimal disturbance. Please respect whomever is speaking by not talking to others and not engaging in computer work during class discussions.

### **Required Course Materials**

Ormsby, Tim, *et al.* 2004: *Getting to Know ArcGIS Desktop, Second Edition Update for ArcGIS 9*. Redlands, CA: Environmental Systems Research Institute (ESRI). (includes CD-ROM). Note: Be sure to get this edition of the text.

Bolstad, Paul. 2002: *GIS Fundamentals: A First Text on Geographic Information Systems*. White Bear Lake, MN. (or later edition)

Blake, Gary and Robert W. Bly. 1993: *The Elements of Technical Writing*. New York: Longman.

Other readings as posted on course Blackboard site ("special readings").

### **Course Requirements**

Course requirements include (1) active participation in class discussions; (2) preparation of 2 synopses (written and oral) of GIS application cases; (3) completion of 8 lab exercises; (4) completion of two problem memo assignments; (5) completion of a research design that employs GIS analytic methods including (a) a formal proposal, and (b) a final research design poster.

*Synopses* summarize the variables, data, methods, findings, and conclusions of readings that describe the application of specific GIS techniques to answer specific planning, policy analysis, or research questions. These should be about 1.5 pages in length.

The *research poster* will focus on an analysis/research problem that is grounded in the scholarly and professional literature of planning or another field if you are not a planning student. I will distribute information about this later in the semester.

**Grading**

Grades will be based on class participation, preparation and presentation of synopses, problem memos, lab assignments, and the research proposal and poster. *All assigned work is due at the beginning of class on the due date. If you turn your work in late, I will take 10% off the grade for each day that it is late.*

*Class participation* grades will be based on preparation and active participation in all aspects of class discussion.

*Synopses* will be graded on a satisfactory/unsatisfactory basis (*i.e.*, either full credit or no credit). They are primarily used to stimulate class discussion of real-world applications of GIS. They are due at different times in the semester, depending on when you sign up.

*Lab assignments* will be graded on a 50-point scale.

*Problem memos* will be graded on content and presentation.

*Research design proposals and papers* will be graded on points that reflect organization, grammar, and spelling as well as content.

<b><u>Task(s)</u></b>	<b><u>Weight</u></b>
Class participation	50 pts
Synopses (written & oral, 50 pts each)	100 pts
Research design proposal	100 pts
Research design poster	250 pts
Lab exercises (50 pts each)	400 pts
Problem memos (50 pts each)	100 pts

**Schedule of Topics** (*subject to almost guaranteed revision*)

<b>Dates</b>	<b>Lecture Topic(s)</b>	<b>Reading</b>	<b>Assignment and Due Date</b>
Week 1, Aug. 20	Introduction; basic GIS concepts and context; introduction to ArcGIS		
Week 2, Aug. 27	Cartography and spatial thinking; map output	GTKAG, pp. 1-18; Bolstad, Ch. 1 (on Blackboard)	
Week 3, Sept. 3	Geographic referencing systems	Bolstad, Chapter 3	Lab #1
Week 4, Sept. 10	GIS data structures, queries, and storage	Bolstad, Chapters 2 & 8	Lab #2
Week 5, Sept. 17	GIS data: collection and base files	Bolstad, Chapter 7	Lab #3
Week 6, Sept. 24	GIS data: input	Bolstad, Chapter 4	Memo #1
Week 7, Oct. 1	GIS data: editing	Bolstad, Chapter 4	Lab #4
Week 8, Oct. 8	NO CLASS (FALL BREAK)		
Week 9, Oct. 15	Classification and reclassification	Bolstad, Chapter 9	Research Proposal
Week 10, Oct. 22	Spatial measurement and proximity analysis	special reading	Lab #5
Week 11, Oct. 29*	More spatial measurement; comparing variables among coverages	special reading	Lab #6
Week 12, Nov. 5	Comparing variables among coverages (cont); network or spatial modeling	special reading	Memo #2
Week 13, Nov. 12	Statistical surfaces	special reading	Lab #7
Week 14, Nov. 19	NO CLASS (T'GIVING BREAK)		
Week 15, Nov. 26	Special Applications: TBD	special reading	Lab #8
Week 16+, Dec. 3+	Presentations of final posters		Research Poster

*note also that you will need to schedule 2 times to turn in written and orally present synopses*