

SYLLABUS – USP 531 – WINTER 2008

Course Info: USP 531: GIS for Planners* (CRN 44207, 4 Credit Hours)
Monday: Cramer 001, 4:20 – 6:20PM (Lectures)
Wednesday: Cramer 001, 4:20 – 6:20PM (Lab Sessions)

Instructor:	Vivek Shandas Urban Studies and Planning Tel: 503.725.5222 Email: vshandas@pdx.edu	Office Hours & Location: Thursdays, 3 – 5:30PM, & by appointment. Urban Center (URBN) 370L.
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Teaching and Lab Assistant: Jane Waddell, email: janev@pdx.edu
Lab Hours for the TA (URBN 225): Mondays, 6:30 – 8PM

Course Description and Objectives

Geographic Information Systems (GIS) for Planners provides an overview of the use, application, and representation of geographic data specific to urban and regional planning. The course is designed for students interested in the theoretical foundations, historical developments, and practical applications of spatial analysis.

The course will provide the framework for meeting several learning objectives through in-class discussions, 'take-home' exercises, and participant presentations. First and foremost, you are expected to develop critical thinking skills to evaluate spatial analytical methods and representations of spatial data. As future planners, critically examining spatial data will be central to your ability to address challenges in urban and regional planning. Other skills you will develop in this course include:

- Problem solving: Analytical capacities to integrate spatial data into the planning process;
- Research design: Craft a study using spatial analysis to address one problem from the field of urban and regional planning;
- Communication: A coherent, thoughtful presentation of analysis in written, graphical, and verbal formats;
- Group work: Develop interpersonal communication while working in teams; and
- Community engagement: Collaborate with community organizations to address an urban and regional planning issue.

In addition and more pragmatically, students are expected to understand how spatial data differ from other types of data, what types of spatial data to use and when, what methods of analysis to apply and why, and how to represent results for planning and other audiences.

* *Working Syllabus: While the learning objectives and core requirements will not change over the term, there may be minor modifications to assignments, order of presentations, and timing of topics. Modifications will be described in class and students are required to be up-to-date on any changes.*

Required Readings and Materials

- I. Gorr, WL., KS Kurland, 2006. GIS Tutorial: Workbook for ArcView 9, Second Edition, ESRI Press.¹
- II. Weekly articles posted in Samla.
- III. Electronic storage device (e.g. memory card, flash drive) adaptable to a USB port and a minimum storage capacity of 512 MB.

Recommended Readings

- I. LeGates, R., 2005. Think Globally, Act Regionally: GIS and Data Visualization for Social Science and Public Policy Research, ESRI Press.
- II. Peters, A., and H MacDonald, 2004. Unlocking the Census with GIS. ESRI Press.
- III. Tufte, ER., 1997. Visual and Statistical Thinking: Display of Evidence for Making Decisions. Graphics Press.

The Basics

In general, the course will be divided into lecture and lab sessions. Mondays will consist of lecture, and Wednesdays will provide lab-time for hands-on use of software. Lectures will generally begin with a warm-up exercise. Warm-up exercises are intended to stimulate thinking about a specific topic, and develop critical thinking skills. Lectures provide an opportunity for students to learn about the theoretical foundations, historical developments, and applications of geographic analysis to urban and regional planning. Lab sessions enable students to work directly with the software and address 'real-world' problems in urban and regional planning. A basic understanding of Windows[®] operating system, including Microsoft Word and Excel, will be helpful in working with the datasets used in this course. While you will have an opportunity to work on assignments during the lab sessions, in most cases you will be expected to complete homework (e.g. assignments and presentation) outside class hours.

This course uses Environmental Systems Research Institute's (ESRI) *ArcGIS 9.2* spatial analysis software for assignments and final project. If you choose, you can receive a complementary copy of *ArcGIS 9.2* (one-year expiration) to load onto your personal computer. You will also be given access to the GIS lab located in the Urban Center 225 when you have signed and returned the UPA GIS Lab User Policy guidelines. Please make sure to abide by all the rules and regulations of the GIS lab – misusing the equipment, software, or data will result in a loss lab privileges.

Every effort will be made to accommodate individuals with disabilities. Please notify the instructor by the first week of the course so that any necessary accommodations can be arranged. More information can be found at:

http://www.pdx.edu/iasc/drc_faculty_resources.html

¹ Available at the PSU bookstore. Please do not order on-line because orders can take up to 4 week for delivery and can cause delays in completing assignments. Also, a previous edition of *GIS Tutorial* exists, but for this course we will be using the *Second Edition*.

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Evaluation Criteria

You will be evaluated on a 1000 point scale, divided into the following criteria:

<i>Assignments (400 points):</i>	40%
<i>Midterm Exam (200 points):</i>	20%
<i>Leading Discussion (100 points):</i>	10%
<i>Course Participation (100 points):</i>	10%
<i>Final Project (200 points):</i>	20%
TOTAL (1000 POINTS)	100%

Late work will be automatically marked down unless prior arrangements have been made with the instructor. Regular class attendance and participation is necessary and expected. Participation includes: involvement with class discussions (includes listening), asking substantive questions, addressing instructor's questions, working effectively in teams, and sharing relevant news and information.

Assignments, Midterm, and Project

To pass this course you will need to complete all assignments, the midterm exam, and final project. All requirements are intended to complement one another – for example, while assignments use general datasets from pre-packaged sources (e.g. ESRI's Virtual Campus and ArcGIS Tutorial), the skills you acquire will be essential to manage datasets used in your final project. This class is cumulative, assuming that the effort you put into completing all the assignments and exercises will be helpful in passing the midterm exam and completing the final project. Assignments will be given to you each week, and expected to be submitted to the teaching assistant by the beginning of the following Wednesday class. The attached 'Course Outline' table provides a brief description of and due-dates for assignments, midterm exam and final project.

MIDTERM: The midterm exam and final project will cover all the major concepts you've learned in class, and require that you apply what you've learned in the assignments. If you've come to class, paid attention, and done well on all the assignments you will have no trouble with the midterm exam. The midterm exam is designed to ensure that you are on track with the basic principles of GIS such that you will be prepared to complete the project and can stay on schedule for the remainder of the class. Some details on the midterm:

Midterm Exam – Monday, February 11

- Covers the first five weeks, including lectures, assignments, readings and discussions --we will have a brief review before the midterm; and
- This will be an in-class exam, with short-answers and technical questions

FINAL PROJECT: You are expected to work in a team (2 - 3 members) to: (1) identify an urban & regional planning problem requiring spatial analysis; (2) collaborate with your team members to develop a research question; (3) conduct analysis to address the research question; (4) present your project; and (5) submit a final report detailing your analysis, and findings. Consider working with a regional organization that could benefit from spatial analysis, and apply your GIS techniques to the needs of an organization.

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Completion dates and description for the final project are provided below. While the instructor will provide feedback on project elements, these submissions will not be graded. The purpose of these submissions is to ensure that you are on-track with completing the final project.

- Project Idea – January 14, 21, 28
 - No more than one page
 - Brief background
 - State the core *research question*
- Initial Data Acquisition – February 4
 - List Data Sources, and *for each*, state the following:
 - How data tie to your research question;
 - What is the source of the data;
 - How the data are measured; and
 - What spatial data models fit
 - Also discuss any missing or problem data sources you have.
- Project Design & Methodology – February 18
 - A flowchart identifying data sources and analysis at all steps.
 - A short narrative (~half-page) describing how your methodology accomplishes your objective.
- Data Analysis – February 25
 - Nothing to be submitted, but try to finish your data analysis by this point. Consult TA or instructor if you are having trouble.
- Presentation – March 12 (regular class time)
 - 15 minutes per presentation (1 3min. + 2 min. questions)
 - Focus on the following elements of your project:
 - Background/Research Question
 - Data/Methodology
 - Summary of Results
 - Interpretation of Results
 - Final project presentations will be evaluated on content (40%), organization (40%), and effective communication (20%).
- Final Report – March 19 (by 5PM)
 - The final report should include the following sections:
 - *Introduction/Background* - What should your audience know about the subject matter to help them understand the topic and the reason for doing your project?
 - *Problem Statement* - Where is the gap in current knowledge, what is your question, and how does your question serve to fill this gap?
 - *Data Summary* (include a map for each of your major GIS data sources) - Where do your data come from? What attributes are contained, and what quality are the data. *Note on data sources: PSU I-drive is not a data source - it's a collection, or a repository, or an archive, but it does not provide any original data. When you*

talk about your sources, you'll need to say where the data came from (hint: look at the metadata).

- *Methodology* - Reflects what you *actually* did – be sure to identify steps using appropriate language.
 - *Analysis Results* (include at least one map here) - Summarize your key findings in relatively objective terms.
 - *Conclusions* - What do your findings say about your research question? How do they inform the knowledge-gap you identified earlier? In what ways do your analysis and findings fall short of being a definitive answer?
- In terms of length, reports should be no more than 20 pages (double-spaced, 12-point font, including figures, but not bibliography or appendices).

Web-Based Course Management

We will be using WebCT, an online course management system used extensively at PSU. Course participants will need to use WebCT for meeting several course requirements, including keeping up with updates to the syllabus, downloading readings, and uploading assignments. WebCT also has a forum on which participants can post course-related messages. WebCT is located at: www.psuonline.pdx.edu. To sign on to WebCT you will need a PSU user identification and password.

Academic Integrity

Portland State University (PSU) takes academic integrity very seriously. PSU strives to provide students with the knowledge, skills, judgment, and wisdom they need to function in society as educated adults. To falsify or fabricate the results of one's research; to present the words, ideas, data, or work of another as one's own; or to cheat on an examination or project corrupts the essential process of higher education. Students failing to adhere to these principles of academic integrity will be penalized. For further information please refer to PSU's student conduct code (<http://www.pdx.edu/dos/conduct.html>) or consult the instructor if you are unsure what constitutes a breach of academic integrity.

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MODULE	UNIT OBJECTIVES	Week	Week & Date	Due on Monday	Monday Lecture	Due on Wednesday	Wednesday Lab
1	Learn principles of geographic analysis; Work directly with software; Consider applications to urban & regional planning	1	Jan 7 & 9		Course overview, GIS defined, software systems; data models	Media Article using Maps	Lab 1: GIS Tutorial 1
		2	Jan 14 & 16	Project Idea; Readings 1	Georeferencing, GPS, Datum, Projections; Database structures, Topology	Assignment 1 (Introduction, 1-1, 1-2)	Lab 2: Map Design
		3	Jan 21 & 23	Group Formation; Readings 2	MLK Holiday - No Class	Assignment 2 (Introduction, 2-1, 2-2)	Lab 3: Geodatabases
2	Learn to evaluate quality of spatial data; Understand spatial analysis techniques; Work with actual data; Develop research application	4	Jan 28 & 30	Group project idea; Readings 3	Creating and manipulating spatial data; Creating new data; US Census Intro	Assignment 2 (Geodatabases 4-1, 4-2)	Lab 4: Importing Spatial Attribute Data
		5	Feb 4 & 6	Project data sources; Readings 4	Geographic data quality and data standards; Spatial autocorrelation; Geocoding	Assignment 4 Due (Importing Spatial and Attribute Data 5-1, 5-2)	Lab 5: Geocoding; Review for Midterm
		6	Feb 11 & 13	Review for Midterm	Midterm; Open Source GIS (guest lecture)	Assignment 5 (Geocoding 7-1, 7-2)	Lab 6: Spatial Data Processing
3	Learn to apply spatial analysis techniques to challenges in urban & regional planning	7	Feb 18 & 20	Project design & methodology; Readings 5	Spatial Analysis 2 (overlay analysis, model builder)	Assignment 6 Due (Spatial Data Processing 8-1, 8-2)	Lab 7: Spatial Analysis
		8	Feb 25 & 27	Project data analysis; Readings 6	Raster Models, TINs 3D Analysis	Assignment 7 (Spatial Analysis 9-1; 9-2)	Lab 8: ESRI's Virtual Campus Module 1 & 2
4	Explore extensions of spatial analysis; Recognize social and cultural context of spatial data; Presentation of analysis in written and verbal forms; Reflect on principles and applications of GIS	9	March 3 & 5	Readings 7	Using maps in planning; Planning Support Systems	Assignment 8 (ESRI's VC Modules 2 & 3)	Lab 9: ESRI's Virtual Campus Modules 3 & 4
		10	March 10 & 12	Readings 8	Spatial Statistics, Advanced modeling; Social and Cultural Context	Assignment 9 (ESRI's VC Modules 4 & 5)	Work on final projects
		11	Finals Week -- March 17 & 19	Final Presentations	Group Presentations (Regular Class Time)	Final Reports Due: March 19 by 5PM on WebCT	<i>Syllabus Created on January 3, 2008</i>