Spatial Demography

Sociology 597 A (Section 1)
& Anthropology 597 A (Section 1)

Course Credits = 3

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All course materials are on ANGEL
https://cms.psu.edu/

Scheduled Class Time & Location

Tuesday 2.30pm – 3.45pm in Room 9 Sparks
Thursday 2.30pm – 3.45pm in 122 Pond

Office Hours
Tuesday & Thursday
4.00-5.00pm
507 Oswald Tower

Teaching Assistant
None Assigned

Course Description

This graduate seminar will expose sociologists, anthropologists and demographers to the vast array of spatial data that are available, encourage them to think critically and creatively about how different forms of spatial data can be integrated in their research, and introduce them to the spatial analytical methods that are increasingly encountered in demographic inquiry. More specifically the course will examine the characteristics of spatial data (represented as points, lines, areas and surfaces) and focus on methods appropriate for exploring and modeling such data. The emphasis in the course will be on area (or lattice) data though spatial point pattern analysis and geostatistics methods will be discussed.

The seminar will focus on applications and demonstrations drawn mostly from studies of urban poverty, neighborhood research, racial/ethnic diversity, maternal and child health and wellbeing, and population-environment relations.

This is not a GIS course but throughout the semester you will have plenty of opportunity to learn *ArcGIS 9.x* and other software, namely *GeoDa* a program that facilitates exploratory spatial data analysis and can be used for spatial regression modeling. Throughout the seminar we will discuss GIS in academic, government, and applied demographic settings; data collection strategies that facilitate fieldwork; and the new directions and challenges associated with GIS technologies.

Participants will also learn practical techniques associated with the analysis and visualization of demographic data ranging from how to communicate with maps and create maps for use in PowerPoint, the use of address-matching, data integration tools, use of ethnographic data, and statistical measures for point and area analysis (e.g. spatial regression models and spatial autocorrelation tests).

There are THREE assignments totaling EIGHTY percent of the course grade;
TWENTY percent is assigned for attendance, in-class exercises, discussion and participation.

(see Assignments: Titles, due dates, and grade points on page 22)

Course Objectives

There are both primary and secondary goals for this course. The two primary goals are to (a) help you develop and think about ways in which a spatial perspective might contribute to your own research, and (b) explore ways in which we can operationalize this through the use spatial analysis and GIS techniques.

In addition to these primary goals I want you to have fun and also along the way perhaps to better understand the potentials of GIS in demographic research, and to become familiar with methods for using GIS and related technologies at multiple stages of a research process – from data collection strategies (facilitating fieldwork) though to data visualization and spatial analysis; identifying, integrating, manipulating and analyzing data; and, identifying new directions and challenges associated with GIS technologies.

Course Structure

Throughout the course I will be including examples from demography projects at PRI. In addition I will endeavor to introduce examples and readings on an array of demographic research topics. The course will attempt to be as much about substantive demographic research as it is about learning about GIS and spatial analysis tools. The substantive topics we will discuss will include but not be limited to neighborhood effects, race/ethnic segregation, health inequality, urban social problems (crime, neglect, etc.), public health, epidemiology, and population and environment relations. Similarly, examples and discussion will focus on the integration of different forms of data within a GIS such as qualitative data.

Please note currently no "demography" text covers GIS, and very few GIS texts focus on demographic themes. As many of you are in the demography major I will assume that during your training you will read extensively on demographic methods but that you are unlikely to read any GIS or spatial analysis literature. This being the case, one objective is that each of you will have read through Goodchild & Janelle (2004) *Spatially Integrated Social Science* and research articles by the end of this semester. Most articles will be placed on ANGEL https://cms.psu.edu/.

The course is organized around

1. **Textbook/Workbooks**

Michael F. Goodchild and Donald G. Janelle. 2004. *Spatially Integrated Social Science*. New York, NY: Oxford University Press

Maribeth Price. 2005. *Mastering ArcGIS* (Second Edition). New York, NY: McGraw-Hill.

Luc Anselin. 2005. *Exploring Spatial Data with GeoDa: A Wookbook* UC Santa Barbara, CA: Center for Spatially Integrated Social Science (available on ANGEL)

I assigned Price (2005) *Mastering ArcGIS* (Second Edition) as this is solid workbook that allows one to come quickly up to speed on ArcGIS 9. It will not train you in every aspect of ArcGIS 9 nor will it provide you with everything you need to know about handling geospatial data but it will provide you with a good grounding and with confidence to take on more challenging tasks. **Assignment #1 is to complete the exercises in this book and write a critical review of the workbook by Feb 23, 2007.**

2. **Supplemental readings**

Most of the supplemental readings will available on ANGEL and/or available via the Internet. Some readings are included as useful references for those wishing to "go further" but they are not required reading; these more advanced texts are marked with an asterisk (*); see page 11-24 below.

3. **PowerPoint slides prepared for each class**

The PowerPoint files will be placed on ANGEL as soon after each lecture/lab as is practicable.

Course Outline

Week	Date	Lecture themes
Week 1	January 16	Overview and Goals of the Course
	January 18	Why Spatial Demography?
Week 2	January 23	Lab: U.S. Census Project
	January 25	Fundamental Spatial Concepts
Week 3	January 30	Lab: International Data Project
	February 1	How to Lie with Maps and Data Privacy
Week 4	February 6	Lab: Cartography 101
	February 8	Basic Spatial Analysis ***This class will likely need to be re-scheduled as I will be in Washington DC Feb 8-9, 2007***
Week 5	February 13	Lab: Geocoding
	February 15	Contextual Analysis & GIS
Week 6	February 20	Lab: Geoprocessing Tools
	February 22	Exploratory Spatial Data Analysis
	Assignment 1 is due Friday February 23, 2007	
Week 7	February 27	Lab: GeoDA for Exploratory Spatial Data Analysis
	March 1	Spatial Regression Modeling
Week 8	March 6	Lab: GeoDa for Spatial Regression Modeling # 1
	March 8	Spatial Regression Modeling

Spring Break – No classes March 12, 3007– March 16, 2007

Week 9	March 20	Lab: GeoDa for Spatial Regression Modeling #2
	March 22	Seminar focusing on Segregation
	Assignment #2 is due Friday March 23, 2007	
Week 10	March 27	Lab: Geographically Weighted Regression
	March 29	Seminar focusing on Neighborhoods and Health ***This class will likely need to be re-scheduled as I will be in New York March 28-31, 2007 for the PAA Meetings***
	Assignment #3 (Draft) is due Monday April 2, 2007	
Week 11	April 3	Lab: Spatial Point Pattern Analysis
	April 5	Seminar focusing on Environmental Justice
Week 12	April 10	Lab: Geostatistics
	April 12	Seminar focusing on Regional Level Analysis
Week 13	April 17	Lab: Open lab for work on final project
	April 19	Seminar on Population and Environment
Week 14	April 24	Lab: Open lab for work on final projects
	April 26	Future Directions in Spatial Demography (Agent-based Modeling)
Week 15	May 1	Final Presentations (15 minutes each including questions)
	May 3	Final presentations (15 minutes each including questions)
Week 16	May 8	Final Project Term paper due
	Assignment #3 (Final) is due Tuesday May 8, 2007	

Assignments: Titles, due dates, and grade points

There are **THREE** assignments totaling **EIGHTY percent** of the course grade. These assignments are for you to complete outside of class hours. Students are encouraged to work with – and learn from - one another but each student is required to prepare and submit assignments on their own. If you receive significant assistance in preparing an assignment you are expected to acknowledge this assistance in an acknowledgement section. *No changes in due dates for any assignments are anticipated. Any change can only be made by me and will not be official unless it is revealed in an e-mail to the entire class.*

TWENTY percent is assigned for attendance, in-class labs, participation and discussion. Please note to facilitate class discussion (Thursday classes) each student will send an e-mail to me with at least two questions on the assigned readings for that week – this e-mail will be a component of the assessed attendance grade.

Below is a listing of assignment titles, due dates and percentage of grade allocated to each assignment.

Titles	Due Date	Points
1: Mastering ArcGIS (20% is reserved for progress through the exercises in the workbook and 10% is reserved for a written critical review of the workbook).	February 23	30
2: Spatial Demography 'Classic' (the subject of the 'classic' must be approved by me by February 28).	March 23	15
3: Final Project (this includes grades for a draft (5), the in-class presentation (10), and a final paper (20)	April 2 – draft (5%) May 1 – presentation (10%) May 8 – final term paper (20%)	35
Attendance, In-class labs and Participation/Class Discussion	Ongoing	20
Total		**100**

A description of each assignment is included at the end of this syllabus (page 28-32) and these will also be posted on **ANGEL**. Brief descriptions and salient issues appear below.

Please note …

For the **Mastering GIS** assignment you are expected to read and work through the exercises outside of class completing on average two chapters per week for the first six weeks of the course. The assignment associated with these exercises is due **February 23, 2007**.

For the **spatial demography classic** you are expected to identify the subject of your report and receive

approval from me before **February 28, 2007**. The assignment is due **March 23, 2007**.

For the **final project** (presentation and term paper) you are encouraged to **find a data set** early in the semester. This final project has several components – all of which contribute to the grade. I would like to see a 2-3 page draft by **April 2, 2007** and a copy of the PowerPoint presentation to be use for the in-class presentation by **May 1, 2007** (irrespective of whether you are presenting on that day; some of the class will present on May 3, 2007). The written term paper is due on **May 8, 2007**.

For **attendance, in-class labs, participation and discussion** an important part of 'participation' will be the discussion of the readings. To facilitate class discussion (typically Thursday classes) each student will **send an e-mail to me with at least two questions by Noon each Wednesday** on the assigned readings for that week – this e-mail will be a component of the assessed attendance grade. If I no not receive sample questions you will receive a zero for the participation/discussion part of the 'attendance' grade. Please note that throughout the course I expect to use e-mail as the primary mode of communication outside of the class meeting times (see below under "Communication" p. 8).

I expect that all **In-class labs** will be completed, if not within the class meeting time than at a later date. While these in-class assignments are not for a grade *per se* they are designed to introduce you to selected data extraction, integration and analysis tasks. It is in your own best interests to complete these as they will provide hands-on experience and tips to help you through the final project.

Attendance Policy

Please note **TWENTY** percent of the grade is assigned for attendance, in-class lab assignments, discussion and overall course participation.

Grading Policy

Each assignment will be graded on a scale of 0-10. *Please note that assignments are worth 5, 10, 15, or 20 percent of the overall course grade. That is, a score of 8 for an assignment worth 20 percent of the course grade will be worth 16% of the overall grade.* A score of 7 is a good competent piece of work. Scores of 8 would represent very good, 9 excellent, and 10 is reserved for outstanding work (where extra initiative/innovation clearly sets the work apart). Late assignments will be reduced by a score of 1 (10%) for each day they are late. A grade of zero will be assigned to assignments not turned in.

For any completed assignment submitted on-time but where the original grade score is 4 or below (i.e., judged to be poor) it can be re-done and re-submitted within seven days of its return to you for a revised grade. The revised grade will be penalized a grade of 2 points (maximum grade available = 8). This option does not apply to submissions that are incomplete.

Examination Policy

This is a work intensive course. There is no final exam but there is a final in-class presentation due May 1, 2007 and term paper due May 8, 2007.

Communication

By far the best way to communicate with me is via e-mail; I check e-mail several times a day and as often as practicable when traveling.

As much as possible I will communicate with the class through E-mail (matthews@pop.psu.edu). All students are encouraged to send questions or comments on lectures, texts, readings or exercises. Where appropriate I will send responses to questions to all students enrolled in the course, redacting individual identifiers when necessary. If you raise a question but you do not want a reply sending to the class please put **SOC 597 - PRIVATE** in the subject line of the e-mail.

Please note that some e-mails relating directly to the course content may count towards the 'participation' grade (see above page 7). I will provide information to the sender if this is the case.

Technical Needs and Recommendations

The course is not intended as a GIS software course, though of course you will have plenty of exposure to packages, including but not limited to ArcGIS, and GeoDa. Indeed, I am expecting you to work on your own a great deal on GIS exercises and to come up to speed within on ArcGIS 9 by working through the material in "Mastering ArcGIS." This book comes with very useful video clips that walk the user through specific types of tasks.

Those students enrolled in the class in the third week will receive a fully functioning one-year trial version (single-use) of ArcView 9 software on CD-ROM. Please note that the single-use ArcGIS Demo Edition software on the CD requires the Microsoft Windows XP, Windows 2000, or Windows NT (Service Pack 6a) operating system. **Hardware requirements: A minimum 800 MHz processing speed; 256 MB RAM; 800 MB hard disk space, including 50 MB on the operating system drive; an additional 225 MB hard disk space is required for the exercise data.** If you do not have your own laptop that meets these specifications not to worry as ArcGIS 9.x is installed in all public labs on Penn State's University Park campus (and in PRI's 806 lab for those with access).

If you are not already, **I recommend that you become comfortable with generic file management issues**.

If possible **I recommend that you purchase a flash-drive** (the higher the data storage capacity the better in my opinion).

Academic Integrity Policy

As suggested by the College of the Liberal Arts "Penn State defines academic integrity as the pursuit of scholarly activity in an open, honest and responsible manner. All students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts (Faculty Senate Policy 49-20).

Dishonesty of any kind will not be tolerated in this course. Dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Students who are found to be dishonest will receive academic sanctions and will be reported to the University's Judicial Affairs office for possible further disciplinary sanction."

Faculty and students alike are part of an academic community in which the sharing and advancement of knowledge are core values. High standards of academic integrity must be in place to ensure that this intellectual enterprise functions smoothly. Honoring the principles of academic integrity is a fundamental responsibility of all scholars, and the College of the Liberal Arts and the University is firmly dedicated to maintaining an environment in which practicing academic integrity is the norm.

Below are web-links to resources to aid both faculty and students in understanding and properly engaging the College's academic integrity policy and procedures. This website is divided into two resource sections: one intended for faculty, and one intended for students.

Introduction page	http://www.la.psu.edu/undergrad/integrity/integrity.htm
Faculty resource page	http://www.la.psu.edu/undergrad/integrity/facultypolicy/facultyres.htm
Student resource page	http://www.la.psu.edu/undergrad/integrity/studentpolicy/studentres.ht

Disability Access Statement

Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for modifications or reasonable accommodations in this course, contact the Office for Disability Services, ODS, located at 116 Boucke Building at 1-814-863-1807 (V/TTY). For further information regarding ODS please visit their web site at http://www.lions.psu.edu/ods/. Instructors should be notified as early in the semester as possible regarding the need for modification or reasonable accommodations.

Course Links

The ANGEL site will include a host of suggested Internet links. Some highly recommended web-links include:

PRI's GIA Core http://www.pop.psu.edu/gia-core/ (and associated links)

GIS and Population Sciences Project http://csiss.ncgia.ucsb.edu/GISPopSci/

Center for Spatially Integrated Social Science (CSISS) http://www.csiss.org/

References/Reading Materials

Supplemental readings will be distributed throughout the course via the ANGEL site. Under LESSONS / Week xx there will be a readings folder containing PDFs of additional articles and materials.

Please note there are numerous reference materials included on the ANGEL site (specifically under LESSONS/ Course Resources/ Bibliographies).

Required and other suggested readings week-by-week follow

Suggested Readings by Week

Week 1 **January 16** **Overview and Goals of the Course**
January 18 **Why Spatial Demography?**

Assigned Texts:

Goodchild & Janelle:

Michael F. Goodchild and Donald G. Janelle. 2004. Thinking spatially in the social sciences (Chapter 1)

John R. Weeks. 2004. The role of spatial analysis in demographic research. (Chapter 19)

Price:
Introduction
Introducing ArcGIS (Chapter 1)
Working with ArcMap (Chapter 2)

Additional Required Reading:

Michael F. Goodchild, Luc Anselin, Richard P. Applebaum, and Barbara Herr Harthorn. 2000. Toward Spatially Integrated Social Science. *International Regional Science Review* 23, 139-159. (ANGEL)

Paul Voss. 2004. Demography as a spatial social science (unpublished manuscript) Applied Population Laboratory, University of Wisconsin. (ANGEL)

Kenneth W. Watcher. 2005. Spatial Demography. *Proceedings of the National Academy of Sciences*. 102 (43), 15299-15300. (ANGEL)

Spatial social science for research, teaching, application and policy. *CSISS Brochure* (ANGEL)

Optional Reading:

Stephen A. Matthews. 2003. GIS and spatial demography. PRI-GIA Core Resource Document 03-63 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_03-63.pdf (ANGEL)

Marcia Castro. 2005. Spatial demography: an opportunity to improve policy making at diverse decision levels. PAA Presentation (ANGEL)

NOTE: a series of extensive literature searches on substantive applications of GIS and spatial analysis were completed in early 2006. These reference lists can be found on the PRI GIA Core website – specifically at URL: http://www.pop.psu.edu/gia-core/litsearches.htm. This site should be consulted frequently during the course.

Week 2 **January 23** **Lab: U.S. Census Project**
January 25 **Fundamental Spatial Concepts**

Assigned Texts:

Price:
Coordinate Systems and Map Projections (Chapter 3)
Drawing and Symbolizing Features (Chapter 4)

Additional Required Reading:

None.

Optional Reading:

Frances Burden. 2002. Census CD+Maps. PRI-GIA Core Resource Document 02-24 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-24.pdf (ANGEL)

Steve Graham. 2002. Census 2000 data and software. PRI-GIA Core Resource Document 02-35 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-35.pdf (ANGEL)

Other Useful References

Alan Peters and Heather McDonald. 2004. *Unlocking the Census with GIS*. Redlands, CA: ESRI Press.

Useful websites:

US Census Bureau http://www.census.gov

PRI's GIA Core http://www.pop.psu.edu/gia-core/

Week 3 **January 30** **Lab: International Data Project**
February 1 **How to Lie with Maps and Data Privacy**

Assigned Texts:

Goodchild & Janelle:

David O'Sullivan. 2004. Too much of the wrong kind of data: Implications for the practice of micro-scale spatial modeling (Chapter 5)

Price:
Working with Tables (Chapter 5)
Queries (Chapter 6)

Additional Required Reading:

Marc Armstrong. 2002. Geographic information technologies and their potential erosion effects on personal privacy. *Studies in the Social Science* 27, 19 –28. (ANGEL)

Barbara Entwisle, Ronald R. Rindfuss, Stephen J. Walsh, Tom P. Evans and Sara R. Curran. 1997. Geographic Information Systems, spatial network analysis, and contraceptive choice. *Demography* 34(2): 171-187.

Stephen A. Matthews. 2003. GIS and privacy. PRI-GIA Core Resource Document 03-51 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_03-51.pdf (ANGEL)

Leah K. VanWey, Ronald R. Rindfuss, Myron P. Gutmann, Barbara Entwisle, and Deborah L. Balk. 2005. Confidentiality and spatially explicit data: concerns and challenges. *PNAS* October 2005 102 (43), 15337-15342. (ANGEL)

Optional Reading:

Mark P. Armstrong, Gerald Rushton, and D.L. Zimmerman.1999. Geographically masking health data to preserve confidentiality. *Statistics in Medicine* 18, 497-525. (ANGEL)

Prem Bhandari and Steve Graham 2002. International Databases. PRI-GIA Core Resource Document 02-25 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-25.pdf (ANGEL)

Prem Bhandari. 2002. Digital Chart of the World. PRI-GIA Core Resource Document 02-26 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-26.pdf (ANGEL)

Other Useful Resources

DHS surveys are now usually collected using GPS to geocode survey clusters (see "New Directions: DHS Surveys Incorporate Geographic Data" DHS+ Dimensions Newsletter (Spring) 2000 2 (1) 1-2 (ANGEL).

Week 4 **February 6** **Lab: Cartography 101**
February 8 **Basic Spatial Analysis**

Assigned Texts:

Price:
Spatial Joins (Chapter 7)
Map Overlay (Chapter 8)

Additional Required Reading:

Optional Reading:

Jim Detwiler. 2002. Color selection. PRI-GIA Core Resource Document 02-45 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-45.pdf (ANGEL)

Stephen A. Matthews. 1999. Working with PopMap: integration of population, reproductive health and geographic databases. United Nations Statistics Division, United Nations. (Chapter 4) (ANGEL)

Brian McManus. 2003. Map projections. PRI-GIA Core Resource Document 03-56 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_03-56.pdf (ANGEL)

Brian McManus. 2005. Thematic mapping. PRI-GIA Core Resource Document 05-70 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_05-70.pdf (ANGEL)

Tse-chuan Yang. 2005. Choropleth mapping. PRI-GIA Core Resource Document 05-72 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_05-72.pdf (ANGEL)

NOTE: Excellent cartography texts include:

D.J. Cuff and M.T. Mattson. 1982. *Thematic Maps: Their Design and Production*. Routledge: London, UK.; J.S. Keates. 1982. *Understanding Maps*. John Wiley: New York, NK. USA; A.H. Robinson, R.D. Sale, J.L. Morrison and P.C. Muehrcke. 1984. *Elements of Cartography* (Fifth Edition). John Wiley: New York, NY, USA; B.D. Dent. 1985. *Cartography Thematic Map Design*. W.C. Brown Publishers: Dubuque, IA, USA; M. Monmonier and G. A. Schnell. 1988. *Map Appreciation*. Prentice Hall: Englewood Cliffs, NJ, USA; M. Monmonier. 1991. *How to Lie with Maps*. University of Chicago Press: Chicago, IL, USA.; P.C. Muehrcke. 1992. *Map Use: Reading, Analysis and Interpretation* (Third edition) JP Publications: Madison, WI, USA; M. Monmonier. 1993. *Mapping it Out: Expository Cartography for the Humanities and Social Sciences.* University of Chicago Press: Chicago, IL, USA; A.M. MacEachren. 1994. *SOME Truth with Maps: A Primer on Symbolization and Design*. Association of American Geographers: Washington DC, USA.

Week 5 **February 13** **Lab: Geocoding**
February 15 **Contextual Analysis & GIS**

Assigned Texts:

Goodchild and Janelle:

Mei-po Kwan and Jiyeong Lee. 2004. Geovisualization of human activity patterns using 3D GIS: A time-geographic approach (Chapter 3)

Price:
Presenting Data (Chapter 9)
Geocoding (Chapter 10)

Additional Required Reading:

Ana V. Diez Roux 2003. The examination of neighborhood effects on health: conceptual and methodological issues related to the presence of multiple levels of organization. Chapter 3 in Ichiro Kawachi and Lisa F. Berkman [Editors] *Neighborhoods and Health*. New York, NY: Oxford University Press. (ANGEL)

Thomas A. Glass and Matthew J. McAtee. 2006. Behavioral science at the crossroads in public health: extending horizons, envisioning the future. *Social Science and Medicine* 62, 1650-1671. (ANGEL)

Sally Macintyre and Anne Ellaway. Neighborhoods and health: an overview. Chapter 2 in Ichiro Kawachi and Lisa F. Berkman [Editors]. *Neighborhoods and Health*. New York, NY: Oxford University Press. (ANGEL)

Stephen A. Matthews, James E. Detwiler and Linda M. Burton. 2005. Geoethnography: coupling geographic information analysis techniques with ethnography methods in urban research. *Cartographica* 40(4), 75-90. (ANGEL)

Optional Reading:

Munroe Eagles et al. 2004. The spatial structure of urban political discussion networks (Chapter 10 in *Goodchild and Janelle*)

G. Thomas Kingsley. 1999. Building and Operating Neighborhood Indicator Systems: A Guidebook. National Neighborhood Indicators Partnership Report. Washington, D.C.: The Urban Institute, March 1999. Available at http://www2.urban.org/nnip/pdf/guidbk.pdf

Michelle Zeiders. 2002. Creating GIS data. PRI-GIA Core Resource Document 02-37 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-37.pdf (ANGEL)

Week 6 **February 20** **Lab: Geoprocessing Tools**
February 22 **Exploratory Spatial Data Analysis**

Assigned Texts:

Price:
Basic Editing in ArcMap (Chapter 11)
More Editing Techniques (Chapter 12)

Luc Anselin. 2005. *Exploring Spatial Data with GeoDa: A Wookbook*
(Chapters 1-8)

Additional Required Reading:

Sergio J. Rey and Luc Anselin. 2006. Recent Advances in Software for Spatial Analysis in the Social Sciences. *Geographical Analysis* 38, 1-4. (ANGEL)

Luc Anselin, Jacqueline Cohen, David Cook, Wilpen Gorr, and George Tita. 2000. Spatial analysis of crime. *Criminal Justice* 4 213-262. (ANGEL)

Optional Reading:

NOTE: Excellent exploratory data analysis texts include:

J.W. Tukey. 1977. *Exploratory Data Analysis*. Addison-Wesley: Reading, MA, USA.; E.R. Tufte. 1983. *The Visual Display of Quantitative Information*. Graphics Press: Cheshire, CT, USA.; E.R. Tufte. 1990. *Envisioning Information*. Graphics Press: Cheshire, CT, USA.; W.S. Cleveland. 1993. *Visualizing Data*. AT&T Laboratories: Murray Hill, NJ, USA.; W.S. Cleveland. 1994. *The Elements of Graphing Data*. AT&T Laboratories: Murray Hill, NJ, USA. Also on a similar theme and deserving of mention, D. Huff. 1954. *How to Lie with Statistics*. Norton Press: New York, NY, USA.. See footnote #2 for specific books in cartography.

Week 7 February 27 Lab: GeoDA for Exploratory Spatial Data Analysis
March 1 Spatial Regression Modeling

Assigned Texts:

Goodchild & Janelle:

Steven F. Messner and Luc Anselin. 2004. Spatial analysis of homicide with areal data. (Chapter 7)

Luc Anselin. 2005. *Exploring Spatial Data with GeoDa: A Wookbook*
Chapters 9-16

Additional Required Reading:

Anselin, Luc, Ibnu Syabri and Youngihn Kho. 2006. GeoDa: An Introduction to Spatial Analysis. *Geographical Analysis* 38 (1), 5-22. (ANGEL)

Anselin, Luc. 1995. Local Indicators of Spatial Association – LISA. *Geographical Analysis* 27 92), 93-115. (ANGEL)

Guilmoto, C.Z. and S. I. Ragan. 2001. Spatial patterns of fertility transition in Indian districts. *Population and Development Review* 27 (4), 713-738.

Optional Reading:

Gordon F. DeJong, Deborah Roempke Graefe, Shelley K. Irving, and Tanja St. Pierre. 2006. Measuring state TANF policy variations and change after reform. *Social Science Quarterly* 87(4), 755-781. (ANGEL)

Robert D. Baller, Luc Anselin, Steven F. Messner, Glenn Deane and Darnell F. Hawkins 2001. Structural covariates of U.S. County homicide rates: incorporating spatial effects. *Criminology*, 39(3), 561-590. (ANGEL)

Week 8 March 6 Lab: GeoDa for Spatial Regression Modeling # 1
March 8 Spatial Regression Modeling

Assigned Texts:

Goodchild & Janelle:

Robert J. Sampson and Jeffrey D. Moronoff. 2004. Spatial (dis)advantage and homicide in Chicago neighborhoods (Chapter 8)

Luc Anselin. 2005. Exploring Spatial Data with GeoDa: A Wookbook
Chapters 17-25

Additional Required Reading:

Nathaniel Beck et al. 2006. Space is more than geography: using spatial econometrics in the study of political economy. *International Studies Quarterly* 50, 27-44. (ANGEL)

Robert J. Sampson, Jeffery D. Morenoff and Felton Earls, 1999 "Beyond social capital: spatial dynamics of collective efficacy for children" *American Sociological Review* 64: 633-660.

Jeffrey D. Morenoff. 2003. Neighborhood mechanisms and the spatial dynamics of birth weight. *American Journal of Sociology* 108 (5) 976-1017. (ANGEL)

Optional Reading:

* Luc Anselin. 2002. Under the hood: Issues in the specification and interpretation of spatial regression models. *Agricultural Economics* 27 (3), 247-267. (ANGEL)

* Luc Anselin. 2004. Spatial externalities, spatial multipliers and spatial econometrics. *International Regional Science Review* (ANGEL)

Roger S. Bivand, 2002. ''Spatial econometrics functions in R: classes and methods.'' *Journal of Geographical Systems* 4, 405–21.

Jeffrey D. Morenoff, and Robert J, Sampson. 1997. Violent crime and the spatial dynamics of neighborhood transition: Chicago, 1970-1990. *Social Forces* 76, 31-64.

Jeffrey D. Morenoff, Robert J. Sampson, R. J., and Stephen W. Raudenbush. 2001. Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. *Criminology* 39, 517-560.

Spring Break – No classes March 12, 3007– March 16, 2007

Week 9 **March 20** **Lab: GeoDa for Spatial Regression Modeling #2**
March 22 **Seminar focusing on Segregation**

Assigned Texts:

Goodchild & Janelle:

John Logan and Wenquan Zhang. 2004. Identifying ethnic neighborhoods with census data: group concentration and spatial clustering. (Chapter 6)

Additional Required Reading:

Frank, Andrea I. 2003. Using measures of spatial autocorrelation to describe socio-economic and racial residential patterns in US urban areas. Pp. 147-162. In David Kidner, Gary Higgs, and Sean White [Eds.] Socio-Economic Applications of Geographic information Science (Innovations in GIS 9). London, UK: Taylor and Francis.

Wong, David, W.S. 2003. Implementing spatial segregation measures in GIS. *Computers, Environment and Urban Systems* 27, 53-70.

NOTE: The NSF Measuring Spatial Segregation Project (Reardon/Matthews) has generated a number of manuscripts including:

Sean Reardon et al. 2006. The Segregation Profile: Investigating How Metropolitan Racial Segregation Varies by Spatial Scale. (ANGEL)

Barrett Lee et al. 2006. Beyond the Census Tract: Patterns and Determinants of Racial Residential Segregation at Multiple Scales. (ANGEL)

These manuscripts are available from the project website at URL: **http://www.pop.psu.edu/mss/**

Optional Reading:

Wong, David, W.S. 2002. Spatial measures of segregation and GIS. *Urban Geography* 23, 85-92.

Wong, David, W.S. 2004. Comparing traditional and spatial segregation measures: a spatial scale perspective. *Urban Geography* 25 (1), 66-82.

Week 10 March 27 Lab: Geographically Weighted Regression
March 29 Seminar focusing on Neighborhoods and Health

Assigned Texts:

Goodchild & Janelle:

Anthony C. Gatrell and Janette E. Rigby. 2004. Spatial perspectives in public health (Chapter 18)

Additional Required Reading:

Craig Duncan, Kelvyn Jones and Graham Moon. 1993. Do Places Matter? A multilevel analysis of regional variations in health-related behavior in Britain. *Social Science and Medicine* 37, 725-733. (ANGEL)

Pickett, K.E. and M. Pearl 2001. Multilevel analyses of neighborhood socioeconomic context and health outcomes: a critical review. *Journal of Epidemiology and Community Health* 55, 111-122.

Narayan Sastry. 1996. Community characteristics, individual and household attributes, and child survival in Brazil. *Demography* 33(2): 211-229. (ANGEL)

S.V. Subramanian, Kelvyn Jones and Craig Duncan. 2003. Multilevel methods for public health research. Chapter 4 in Ichiro Kawachi and Lisa F. Berkman [Editors] *Neighborhoods and Health*. New York, NY: Oxford University Press. (ANGEL)

Optional Reading:

* Basile Chaix, Juan Merlo, S.V. Subramanian, John Lynch, and Pierre Chauvin. 2005. Comparison of a spatial perspective with a multilevel analytical approach in neighborhood studies: the case of mental and behavioral disorders due to psychoactive substance use in Malmö, Sweden, 2001. *American Journal of Epidemiology* 162 (2), 171-182. (ANGEL)

* Basile Chaix, Juan Merlo and Pierre Chauvin. 2005. Comparison of a spatial approach with the multilevel approach for investigating place effects on health: the example of healthcare utilization in France. *Journal of Epidemiology and Community Health*. 59, 517-526. (ANGEL)

Ian N. Gregory and Paul S. Ell, 2005. Analyzing spatiotemporal change by use of National Historical Geographical Information Systems: population change during and after the Great Irish Famine. *Historical Methods* 38 (4), 149-167. (ANGEL)

Jeremy L. Mennis. 2006. Mapping the Results of Geographically Weighted Regression. The Cartographic Journal 43(2), 171-179.

Roger S. Bivand, 2006. Implementing spatial data analysis software tools in R. *Geographical Analysis* 38 (1), 23-40.

Week 11 **April 3** **Lab: Spatial Point Pattern Analysis**
April 5 **Seminar focusing on Environmental Justice**

Assigned Texts:

Goodchild & Janelle:

George Tita and Jacqueline Cohen. 2004. Measuring spatial diffusion of shots fired activity across city neighborhoods (Chapter 9)

Additional Required Reading:

Douglas, L. Anderton, Andrew B. Anderson, John M. Oakes and Michael R. Fraser. 1994. Environmental equity: the demographics of dumping. *Demography* 31, 229-48. (ANGEL)

Jason P. Block, Richard A. Scribner and Karen B. DeSalvo. 2004. Fast food, race/ethnicity, and income: a geographical analysis. *American Journal of Preventive Medicine* 27 (3), 211-217. (ANGEL)

Moore L.V. and Ana V. Diex Rouz. 2005. Associations of neighborhood characteristics with the location and type of food stores. *American Journal of Public Health*. 92(11), 1761-1767. (ANGEL)

Shannon N. Zenk, Amy J. Schulz, Barbara A. Israel, Sherman A. James, Shuming Boa, and Mark L. Wilson. 2005. Neighborhood racial composition, neighborhood poverty, and the spatial access of supermarkets in metropolitan Detroit. *American Journal of Public Health* 95 (4), 660-667. (ANGEL)

Optional Reading:

Anthony C. Gatrell, Trevor C. Bailey, Peter J. Diggle, and Barry S. Rowlingson. 1996. Spatial point pattern analysis and its application in geographical epidemiology. *Transactions, Institute of British Geographers NS* 21, 256-274. (ANGEL)

Ned Levine. 2006. Crime mapping and the *CrimeStat* program. *Geographical Analysis* 38, 41-56. (ANGEL)

Jeremy L. Mennis and Lisa M. Jordan, 2005. The distribution of environmental equity: exploring spatial nonstationarity in multivariate models of air toxic releases. *Annals, Association of American Geographers* 95 (2), 249-268.

Kimberly Morland, S. Wing, Ana V. Diez Roux, and C. Poole. Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventive Medicine* 22, 23-29.

Frances Burden. 2003. Point Pattern Analysis. PRI-GIA Core Resource Document 03-41 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_03-41.pdf (ANGEL) (and a little dated … Frances Burden. 2002. CrimeStat II. PRI-GIA Core Resource Document 02-22 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-22.pdf (ANGEL))

Week 12 **April 10** **Lab: Geostatistics**
April 12 **Seminar focusing on Regional Level Analysis**

Assigned Texts:

Goodchild & Janelle:

Gilberto Camara et al. 2004. Mapping social exclusion and inclusion in developing countries: spatial patterns of Sao Paulo in the 1990s (Chapter 11)

Sergio J. Rey. 2004. Spatial analysis of regional income inequality (Chapter 14)

Additional Required Reading:

ESRI 2001. ArcGIS Geostatistical Analysis *(white paper) (ANGEL)*

Stephen A. Matthews. 2002. ArcGIS Geostatistical Analyst. PRI-GIA Core Resource Document 02-19 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_02-19.pdf (ANGEL)

Optional Reading:

Ted K. Bradshaw and Brian Muller. 2004. Shaping policy decisions with spatial analysis (Chapter 15 in Goodchild and Janelle)

Qing Shen. 2004. Updating spatial perspectives and analytical frameworks in urban research (Chapter 13 in Goodchild and Janelle)

Stewart Sweeney and Edward J. Feser. 2004. Business location and spatial externalities: tying concepts to measures. (Chapter 12 in *Goodchild and Janelle*)

Week 13 **April 17** **Lab: Open lab for work on final project**
April 19 **Seminar on Population and Environment**

Assigned Texts:

Goodchild & Janelle:

Bruce Boucek and Emilo F. Moran. 2004. Inferring the behavior of households from remotely sensed changes in land cover: current methods and future directions. (Chapter 2)

Patrick Daley and Gary Lock. 2002. Time, space, and archaeological landscapes: Establishing connections in the First Millennium BC. (Chapter 17)

Additional Required Reading:

Marcia Castro et al. 2006. Malaria risk on the Amazon frontier. *PNAS* 103 (7), 2452-2457.

Pebley, Ann. 1998. Demography and the environment. (PAA Presidential Address) *Demography* 35 (4), 377-389 (ANGEL)

Optional Reading:

John Kanter. 2004. Geographical approaches for reconstructing past human behavior from prehistoric roadways. (Chapter 16 in Goodchild and Janelle)

Week 14	**April 24**	**Lab: Open lab for work on final projects**
	April 26	**Future Directions in Spatial Demography (Agent-based Modeling)**

Assigned Texts:

Goodchild & Janelle:
Itzhak Benenson. 2004. Agent-based modeling: from individual residential choice to urban residential dynamics (Chapter 4)

Roger White et al. 2004. Planning scenario visualization and assessment: a cellular automata based integrated Spatial Decision Support System (Chapter 21)

Brian J.L. Berry. 2004. Spatial analysis in retrospect and prospect (Epilogue, p. 443-446)

Additional Required Reading:

Daniel G. Brown and Yichin Xie. 2006. Spatial agent-based modeling (guest editorial for special issue). *International Journal of Geographical Information Science* 20 (9), 941-943.

Optional Reading:

Jean-Michel Guldmann. 2004. Spatial interaction models of international telecommunication flows (Chapter 20 in Goodchild and Janelle)

Week 15	**May 1**	**Final Presentations (15 minutes each including questions)**
	May 3	**Final presentations (15 minutes each including questions)**

Additional GIS and Spatial Analysis Books (all are good but best are marked **)

Substatively Focused Texts/Edited Collections

Aldenderfer, Mark S. and H.D.G. Maschner. Eds. 1996. *Anthropology, Space and Geographic Information Systems*. New York, NY: Oxford University Press.

Birkin, Mark, Graham Clarke, Martin Clarke and Alan Wilson. 1996. *Intelligent GIS; Location Decisions and Strategic Planning*. New York, NY: GeoInformation International.

Conolly, James and Mark Lake. 2006. *GIS in Archaeology*. Cambridge, UK: Cambridge University Press.

Cromley, Ellen K., and Sara L. McLafferty. 2002. *GIS and Public Health*. New York: Guilford Press. (**)

Elliott, P., J.C. Wakefield, N.G. Best and D.J. Briggs. 2000. *Spatial Epidemiology: Methods and Applications*. New York, NY: Oxford University Press.(**)

Fox, Jefferson, Ronald R. Rindfuss, Stephen J. Walsh and Vinod Mishra [Eds.]. 2003. *People and the Environment: Approaches for Linking Household and Community Surveys to Remote Sensing and GIS.* Norwell, MA: Kluwer Academic Publications. (**)

Gatrell, A.C. and M. Loytonen. Eds. 1998. *GIS and Health*. London, UK: Taylor and Francis.(**)

Goldsmith, Victor, Philip G. McGuire, John H. Mollenkopf and Timothy A. Ross. 2000. *Analyzing Crime Patterns: Frontiers of Practice.* Thousand Oaks, CA: Sage Publications. (**)

Goodchild, M.F. et al. Eds. 1996. *GIS and Environmental Modeling: Progress and Research Issues.* Fort Collins, CO: GIS World Books.

Harries, Keith. 1999. *Mapping Crime: Principles and Practice*. Washington D.C.: Crime Mapping Research Center, U.S. Department of Justice. **(ANGEL)**

Hay, S.I., S.E. Randolph, Rogers, D.J. Eds. 2000. *Remote Sensing and GIS in Epidemiology*. San Diego, CA: Academic Press.

Haynes-Young, R., D.R. Green, and S. Cousins. Eds. 1993. *Landscape Ecology and GIS*. London, UK: Taylor and Francis.

Hirschfield, A. and K. Bowers. Ed. 2001. *Mapping and Analysing Crime Data*. New York, NY: Taylor and Francis Inc.

Huxhold, W.E. *An Introduction to Urban GIS*. New York, NY: Oxford University Press.

Khan, O.A. and R. Skinner. Eds. 2003. *Geographic Information Systems and Health Applications*. Hershey, PA: Idea Group Publishers.

Knowles, A.K. Eds. 2002. *Past Time, Past Place: GIS for History*. Redlands, CA: ESRI Press.(**)

Lawson, Andrew. 1999. *Disease Mapping and Risk Assessment for Public Health*. Chichester, UK: Wiley.

Liverman, Diana, Emilo F. Moran, Ronald R. Rindfuss and Paul C. Stern [Eds.] 1998. *People and Pixels: Linking Remote Sensing and Social Science*. Washington D.C.: National Academy Press. (**)

Longley, P.A. and Clarke, G. 1995. *GIS for Business and Service Planning*. New York, NY: John Wiley and Sons.

Maheswaran, R. and M. Craglia. Eds. 2004. *GIS in Public Health Practice.* New York, NY: Taylor and Francis.

Melnick, A.L. Ed. 2002. *Introduction to Geographic Information Systems in Public Health*. Gaithersburg, MD: Aspen Publishers.

Miller, H. and Shaw, S-L. Eds. 2001. *GIS for Transportation: Principles and Applications*. New York, NY: Oxford University Press.

Peters, A. and H. MacDonald. 2005. *Unlocking the Census with GIS*. Redlands, CA: ESRI Press.

Thill, J-C. Ed. 2000. *GIS in Transportation Research*. Pergamon Press Inc.

Waller, L. and C.A. Gotway. 2004. *Applied Spatial Statistics for Public Health Data*. New York, NY: Wiley.

Workbooks and ESRI Press

Amdahl, G. 2001. *Disaster Response: GIS for Public Safety*. Redlands, CA: ESRI Press.

Arctur, D. and M. Zeiler. 2004. *Designing Geodatabases: Case Studies in GIS Data Modeling*. Redlands, CA: ESRI Press.

Brewer, C.A. 2005. *Designing Better Maps: A Guide for GIS Users*. Redlands, CA: ESRI Press. (**)

David, D.E. 1999. *GIS for Everyone: Exploring Your Neighborhood and Your World with a GIS.* Redlands, CA: ESRI Press.

Gorr, Wilpen, L. and Kristen S. Kurland. 2005. *GIS Tutorial: Workbook for ArcView 9*. Redlands, California: ESRI Press. (**)
Greene, R.W. 2000. *GIS in Public Policy: Using Geographic Information for More Effective Government*. Redlands, CA: ESRI Press.
Greene, R.W. 2001. *Open Access: GIS in e-Government.* Redlands, CA: ESRI Press.
Hanna, K.C. 1999. *GIS for Landscape Architects*. Redlands, CA: ESRI Press.
Johnston, K., J.M. ver Hoef, K. Krivoruchko, and N. Lucas. 2001. *Using ArcGIS Geostatistical Analyst*. Redlands, CA: ESRI Press. (**)
Lang, L. 1998. *Managing Natural Resources with GIS*. Redlands, CA: ESRI Press.
Lang, L. 1999. *Transportation GIS*. Redlands, CA: ESRI Press.
McCoy, J. and K. Johnston. 2001. *Using ArcGIS Spatial Analyst*. Redlands, CA: ESRI Press.
Mitchell, A. 1997. *Zeroing In: Geographic Information Systems at Work in the Community*. Redlands, CA: ESRI Press. (**)
Mitchell, Andy. 1999. *The ESRI Guide to GIS Analysis Volume 1: Geographic Patterns & Relationships*. Redlands, CA: ESRI Press.
Mitchell, Andy. 2005. *The ESRI Guide to GIS Analysis: Volume 2: Spatial Measurements and Statistics*. Redlands, CA: ESRI Press.(**)
Ormsby, T., E. Napoleon, R. Burke, C. Groess and L. Feaster. 2001 & 2004. *Getting to Know ArcGIS Desktop: Basics of ArcView, ArcEditor, and ArcInfo*. Redlands, CA: ESRI Press.
Steede-Terry, K. 2000. *Integrating GIS and Global Positioning Systems*. Redlands, CA: ESRI Press.

General Overviews of GIS/Spatial Analysis

Arlinghaus, S.L. and Daniel A. Griffith [Eds]. 1996. *Practical Handbook of Spatial Statistics*. Boca Raton, FL: CRC Press.
Bailey, Trevor C. and Anthony C. Gatrell. 1996. *Interactive Spatial Data Analysis*. Harlow, UK: Longman.(**)
Batty, Michael and Paul A. Longley [Editors]. 2003. *Advanced Spatial Analysis: The CASA Book of GIS.* Redlands, CA: ESRI Press.(**)
Bernhardsen. T. 1999. *Geographic Information Systems: An Introduction*. New York, NY: Wiley.
Braken, I. and C.Webster. 1990. *Information Technology in Geography and Planning: Including Principles of GIS*. New York, NY: Routledge, Chapman and Hall, Inc.
Burrough, P.A. 1986. *Principles of Geographic Information Systems for Land Resources*. Oxford, UK: Clarendon Press. The original GIS text (**)
Burroughs, P.A. and R.A. McDonnell. 1998. *Principles of Geographic Information Systems*. New York, NY: Oxford University Press.
Chou, Y-H. 1997. *Exploring Spatial Analysis in Geographic Information Systems*. Sante Fe, NM: OnWord Press.
Chrisman, N.R. 1997. *Exploring Geographic Information*. New York, NY: John Wiley & Sons, Inc.
Clarke, K. 1990. *Analytical and Computer Cartography*. Englewood Cliffs, NJ: Prentice-Hall Inc.
DeMers, M.M. 1999. *Fundamentals of Geographic Inforamtion Systems*. New York, NY: Wiley.
de Smith, Michael J., Michael F. Goodchild and Paul A. Longley. 2007. *Geospatial Analysis*. Leicester, UK: The Winchelsea Press, Troubador Publishing Ltd (a PDF E-book available at www.spatial-literacy.org) (**)
Fotheringham, A. Stewart, Chris Brunsden and Martin E. Charlton. 2000. *Quantitative Geography: Perspectives on Spatial Data Analysis*. Thousand Oaks, CA: Sage Publications. (**)
Griffith, Daniel A. et al. 1999. *A Casebook for Spatial Statistical Analysis*. New York, NY: Oxford University Press.
Kidner, D.B., G. Higgs, and S. White Eds. 2003. *Socio-economic Applications of GIS: Innovations in GIS 9*. New York, NY: Taylor and Francis.
Longley, P.A. and M. Batty. 1996. *Spatial Analysis: Modeling in a GIS Environment*. New York, NY: GeoInformation International.
Longley, Paul A., Michael F. Goodchild, David J. Maguire and David W. Rhind. 2005. *Geographic Information Systems and Science (Second Edition)*. New York: John Wiley. (**)

Longley, P.A., S.M. Brooks, R. McDonnell, and B. MacMillan. Eds. 1998. *Geocomputation: A Primer*. New York, NY: Wiley. (**)

Maguire, D.J., M.F. Goodchild and D.W. Rhind. Eds. 1991. *Geographical Information Systems: Principles and Applications*. Harlow, UK: Longman. Links to selected chapters and a consolidated bibliography for "Big Book 1" can be found at http://www.wiley.com/gis. (**)

Martin, David. 1996. *Geographic Information Systems: Socioeconomic Applications (Second Edition)*. London: Routledge. (**)

O'Sullivan, David and David J. Unwin. 2002. *Geographic Information Analysis*. New York: John Wiley. (**)

Pickles, J. Eds. *Ground Truth: The Social Implications of GIS*. New York, NY: Guilford Press. (**)

Scholten, H.J. and J.C.H. Stillwell. Eds. 1990. *Geographic Information Systems for Urban and Regional Planning*. Dordrecht: Kluwer Academic Publishers.

Schuurman. N. 2004. *GIS: A Short Introduction*. Blackwell Publishers.(**)

Star, J. and J. Estes. 1990. *Geographic Information Systems: An Introduction*. Englewood Cliffs, NJ: Prentice Hall.

Stillwell, J. and G. Clarke. Eds. 2003. *Applied GIS and Spatial Analysis*. Hoboken NJ, John Wiley.

Tomlin, Dana. 1990. *Geographic Information Systems and Cartographic Modeling*. Englewood Cliffs, NJ: Prentice-Hall Inc.

Wong, David, W.S. and Jay Lee. 2005. *Statistical Analysis of Geographic Information (with ArcView GIS and ArcGIS)*. Hoboken; NJ: John Wiley. (**)

*** Specialized Texts (on spatial econometrics, geographically weighted regressions, hierarchical modeling, spatial statistics, agent-based modeling, etc.)**

Anselin, Luc. 1988. *Spatial Econometrics, Methods, and Models*. Dordrecht: Kluwer Academic.

Anselin, Luc and Raymond J.G.M. Florax. 1995. *New Directions in Spatial Econometrics*. Berlin, Germany: Springer.

Anselin, Luc, R.J.G.M. Florax, and Sergio J. Rey [Eds.]. 2004. *Advances in Spatial Econometrics: Methodology, Tools and Applications*. Berlin, Germany: Springer.(**)

Banajee, Sudipto, Bradley P. Carlin, and Alan E. Gelfand, 2004. *Hierarchical Modeling and Analysis for Spatial Data*. Boca Raton, FL: Chapman and Hall.(**)

Cressie, Noel. 1991. *Statistics for Spatial Data*. New York, NY: John Wiley and Sons.(**)

Diggle, P.J. 2003. *Statistical Analysis of Spatial Point Patterns.* London, UK: Arnold Publishers.

Epstein, J., and R. Axtell, 1996. *Growing Artificial Societies: Social Science from the Bottom Up*. Princeton, NJ: Princeton University Press.(**)

Fotheringham, A.S. and M. Wegener. [Editors] 2000. *Spatial Models and GIS: New Potentials and New Models.* London, UK: Taylor and Francis.

Fotheringham, A. Stewart, and Peter Rogerson [Editors]. 1994. *Spatial Analysis and GIS*. Bristol, PA: Taylor and Francis Inc.

Fotheringham, A. Stewart, Chris Brunsden and Martin E. Charlton. 2002. *Geographically Weighted Regression: The Analysis of Spatially Varying Relationships*. Chichester, UK: John Wiley & Sons. (**)

Getis, Arthur, Jesús Mur and Henry G. Zoller [Eds.]. 2004. *Spatial Econometrics and Spatial Statistics.* Basingstoke, UK: Palgrave MacMillian.

Gimblett, H. Randy [Editor]. 2002. *Integrating Geographic Information Systems and Agent-based Modeling Techniques for Simulating Social and Ecological Processes*. Santa Fe Institute Studies in the Sciences of Complexity; New York, NY: Oxford University Press.

Haining, Robert. 1990. *Spatial Data Analysis in the Social and Environmental Sciences*. Cambridge, UK: Cambridge University Press.(**)

Haining, Robert. 2003. *Spatial Data Analysis: Theory and Practice*. Cambridge, UK: Cambridge University Press. (**)

Upton, G.J.G. and B. Fingleton. 1985. *Spatial Data Analysis by Example*. Chichester, UK: John Wiley.

Assignment #1 Description

Due Date:	***Work through Chapters 1-12 by Feb 23, 2007***	***(20% of course grade)***
	Critique of book by Feb 23, 2007	***(10% of course grade)***
	Overall	***Worth 30% of the course grade***

Overview

Mastering GIS by Maribeth Price (2005) is the assigned 'lab' book for this course. The book includes 15 chapters. Each chapter introduces the basic 'concepts' (mastering concepts) and then skills via a tutorial and exercises. A CD-ROM includes video clips that demonstrate many key steps or sequence of commands used in ArcGIS. In Addition, the CD-ROM includes exercise and sample data sets.

It is recommended that you work through the exercises and plan to complete the first 12 chapters by the end of Week 6 (February 23, 2006). That is, a steady pace of two chapters per week. The goal is simply to get everyone up and running with ArcGIS 9 as quickly as possible. As Price writes "GIS is best learned by doing it, not by studying it."

Please note the following:

1) There will be time set aside during class/lab to discuss the exercises and I will be happy to discuss them during scheduled office hours.

2) If you do not have access to a laptop and cannot install the software on your own machine you can still work through and complete all the exercises by using the data files (on the CD-ROM) with any machine in the Sparks Lab, the PRI computer lab in 806 Oswald Tower (Please get a PRI Windows NT PopNet account ASAP), or indeed any public computer lab on the University Park campus where ArcGIS 9 has been installed (see box below). As you work through the exercises save results to your personal Penn State diskspace and/or a flash-drive.

For general information on Windows Labs on Campus see
http://clc.its.psu.edu/Labs/Windows/

and for information on ESRI products, that is ArcGIS 9, see
http://clc.its.psu.edu/Labs/Windows/Software/SoftwareList2005.aspx#DataBaseApplicationsInformationSystems

Task

This assignment will completed once you provide evidence that you have worked through Chapters 1-12 and have written a 1000-1500 word critique of the book.

A suggested work schedule is as follows:

Complete …

Chapters 1 and 2 by Tuesday of Week 2	(January 23, 2007)
Chapters 3 and 4 by Tuesday of Week 3	(January 30, 2007)
Chapters 5 and 6 by end of Week 3	(February 2, 2007)
Chapters 7 and 8 by end of Week 4	(February 9, 2007)
Chapters 9 and 10 by end of Week 5	(February 16, 2006)
Chapters 11 and 12 by end of Week 6	(February 23, 2006)

The **evidence** that you have completed the exercises in *Mastering ArcGIS* will be screen shots from the challenge problems at the end of each Chapter's Exercises section (Ch 1 = page 55, Ch 2 = page 91). In most instances the challenge problem is an image of some kind (a map or screen shot of the ArcGIS window). A simple screen shot can be "captured" by pressing Print Screen key and pasting into a program such as PowerPoint or MS WORD. **This part of assignment 1 is worth 20% of course grade.**

The 1000-1500 word critique of the book should include a brief review (not a synthesis) of the book (or the first 12 chapters), focusing on the quality of the exercises, whether they were sufficiently taxing, diverse, interesting, and relevant to the course. Which exercises were (un)necessary? End with an overall assessment of the usefulness of the book? **This part of assignment 1 is worth 10% of course grade.**

Assignment #2 – Description

Due Date ***Friday March 23, 2006*** ***Worth 15% of the course grade***

Overview

Consult the CSISS Classics website at http://www.csiss.org/classics/. This site includes reference to 40+ scholars from across the social sciences and their unique contributions to spatial thinking. Usually each "CSISS Classic" is a short document of 1,500-2,000 words plus images and references. Please read a few of these CSISS Classics to get a sense of their structure and content. Note, the definition of a "spatial" component varies quite widely across the examples on the CSISS site and that the emphasis here is on research prior to 1980.

Task

To identify a social science/public health scholar, **preferably a demographer**, who has demonstrated a new idea to some degree based on a spatial perspective/idea. Develop a 1,500-2,000 word document with a synthesis of the scholar's work, their key spatial ideas, and their contribution to demographic science. There is no restriction on the research having to be based on pre-1980 work.

By **Wednesday February 28, 2007** – approximately three weeks before the assignment is due – please provide me with the name of the scholar you identify as a "Classic" and brief (300 word) justification for their selection. This can be done over e-mail.

The best CSISS Classics will, with the permission of the student, be forwarded to Donald Janelle at CSISS for consideration for inclusion on the CSISS website. Don Janelle is aware of this project assignment at Penn State and looks forward to receiving suggestions and worked examples from this course.

Things to bear in mind

While not an obligation please try to identify scholars whose work is demographic, who are researchers from your own discipline, whose work is well known, and who are women (there are very few on the CSISS Classic list). Also, avoid using copyrighted material if at all possible (this is a general rule but happens to be particularly important if the material are to be considered for inclusion on the CSISS website).

The CSISS Demography Classic is to be completed by **Friday March 23, 2007 and is worth 15% of the course grade.**

Assignment #3 – Description

Due Date	***Draft Research Paper due Monday April 2, 2007***	***(5% of course grade)***
	Presentation due Tuesday May 1, 2007	***(10% of course grade)***
	Research Paper due Tuesday May 8, 2007	***(20% of course grade)***
	Overall	***Worth 35% of course grade***

Overview

This "Final" project is about pulling it all together. In this project you will be expected to demonstrate some of the many techniques and skills you have acquired during the semester.

It is never too early to think about the substantive emphasis of your final project and your data needs as well as the software and skill sets you would likely use. You are likely to work in earnest on this project in bits and pieces, with greater emphasis after Spring Break (March 12-16, 2006). After Spring Break you will be comfortable using and mapping geographic data and have begun to encounter more sophisticated spatial analysis tools such as exploratory spatial data analysis and spatial regression statistics. For the final project (presentation and term/research paper) you are encouraged to **find a data set** early in the semester.

You can use any GIS software and the substantive focus can be on any demographic research question, for anywhere in the world, and at any spatial scale (i.e., from a study of a single village all the way up to an investigation of global demographic patterns and trends). I will be there to help if you have no ideas (also see past topics below).

Tasks

The three end products will be

1: a draft of the "research paper." The draft should be approximately 1,000-1,500 words, with some of the material presented in bullet form as necessary. The draft should describe the "research question," identify both the data sources and the analysis technique(s) that will be used. **This part of assignment #3 is due on April 2, 2007 and is worth 5% of the course grade.**

2: a conference length paper presentation in PowerPoint to be delivered to the class during Week 15. NOTE: Conference papers are typically 12-15 minutes. The presentations will occur on Tuesday May 1, 2007 and Thursday May 3, 2007 during regular class meetings. If you are presenting in the second set on May 3, 2007 you must still submit your PowerPoint file on May 1, 2007. Points will be deducted for any changes made to the presentation between submission and presentation. **This part of assignment #3 is due on May 1, 2007 and is worth 10% of the course grade.**

3: a final "research paper." The minimum length of this research paper is 3,000 words plus embedded maps/images/tables as necessary. The maximum length is 6,000 words. **The research paper is due on May 8, 2007 and is worth 20% of the course grade.**

NOTE: An alternative to the PowerPoint presentation is a poster. The poster should be of the standard presented at national conferences such as the Population Association of America – see both PRI's Information Core site http://www.pop.psu.edu/info-core/library/posters.htm and http://www.gradsch.psu.edu/exhibition/guidelines.html).

Sample of Past Projects

US-based projects

Day care availability
Hospital distributions
Labor market and industrial restructuring
Crime and race segregation
Health and Mortality
Leisure activities for the elderly
The demographics of areas with Superfund sites
University recruitment of college athletes
New Immigrant Communities
New demographic issues emerging from the US Census
Racial diversity/segregation
Urbanization/suburbanization and neighborhood change
Demography of Obesity
Crime and Victimization
Population growth
Natural hazards and population at risk
A demographic profile of Native American Indians
Effects of tourism on economic development
School enrollments
The geography of sex offenders
Hypothetical quality of life and residential preferences
Poverty in Appalachia
Environmental justice/racism
Youth crime and delinquency
The demographics of the digital divide
Community Asset Mapping and well-being

Some International Projects
(NOTE: a project can be local, regional, national, continental or global in scale)

Women's health status in India
Population movements in Thailand
Policing and crime in Ontario, Canada
Fertility in Nepal
Regional economic development/labor markets in Peru
Demographics of Taiwan
Population and environment
Women and child wellbeing
Political and human rights
Rice cultivation and food productivity in the Philippines
Family Planning in Kenya
Urbanization and environment in Taiwan
Population and environment links in Malawi
Regional economic development in China
Population aging (e.g., Japan, Europe)
Post-Apartheid South Africa
Industrial accidents

Demographics and geography of sport – the participationin the Winter Olympic Games and/or Soccer World Cup
AIDS (e.g., in Russia, South Africa, etc.) or another health issue (e.g., Avian Flu)
Population movements (e.g., refugees, evacuations, war) tsunami and hurricane events