Quantitative Methods

GEOG 471/571
4 Credits
Winter Quarter 2007
M/W 9:10-11am
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Text Book: *Statistical Methods for Geography: A Students Guide (2nd Ed)*. Peter A. Rogerson, 2005 Sage Press.

More information and materials will be available at blackboard and my personal website

The aim of this course is to examine advanced topics in the statistical techniques used within geography and the spatial sciences. This course will not only examine some of the more powerful aspects of this technology, but also some of the difficulties, pitfalls and uncertainties that occur with the use of spatial information and analysis. It is expected that you will have had some exposure to both Geographical Information Systems and basic statistical analysis prior to taking this course (If you are a bit rusty in basic statistical analysis review Chapter 1-7 in the Rogerson text). This class is part technical (working with software to understand these problems and techniques) and part discussion/demonstration. To these ends, you are expected to have read the assigned material and have questions on the assigned readings so we can discuss the material.

Proposed Schedule:

Week	Dates	Topics	Readings
1	Jan 3	Course introduction; Syllabus; Basic skills assessment	
2	Jan 8/10	Review; SPSS Basics; Intro to Multiple Regression	R Ch8
3	Jan 15/17	**NO CLASS January 15th for Martin Luther King Day;** Multiple Regression (Cont)	R p193-209: A[1]
4	Jan 22/24	Spatial Sampling; Logistic Regression	R p118-122; p209-218: A[2]
5	Jan 29/31	Spatial Autocorrelation; Spatial Regression	R p231-256: A[3]
6	Feb 5/7	Spatial Regression; Expansion (cont); **Midterm Exam Feb 7**	A[4]
7	Feb 12/14	Factor Analysis	R p257-263: A[5]
8	Feb 19/21	Cluster Analysis	R p263-272: A[6]
9	Feb 26/28	Point Pattern Analysis	R p222-231: A[7]
10	Mar 5/7	Geostatistics	A[8]; A[9]; A[10]
11	Mar 16	**Final Exam – Friday, March 16th 10:10 am**. Grads hand in final papers for individual projects	

R = Rogerson; A = Additional Reading (see below)

Since this course relies heavily on in-class demonstrations and project work, attendance is critical (although not a direct basis for grading). If any topic is unclear after lecture, please do not hesitate to see me as soon as possible. If you are unable to attend any class (e.g., because of an OU-sanctioned activity), please notify me ASAP. You will be held responsible for all material covered in class, and deductions will be imposed for projects turned in late (⅓-letter grade per day). If you do miss class, you should make every effort to contact me before the next class period, so that you can catch up on the missed material. No "extra" credit is available, and **all lab exercises and the final project must be completed to pass the course**. I will post all grades and additional handouts on blackboard so make sure to check the site regularly.

Grading Schedule:

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
% Range	100-94	93-90	89-87	86-84	83-80	79-77	77-74	73-70	69-67	66-64	63-60	59 or less

Grade breakdown and due dates:

Project	Description	% of Grade	Due Date
1	Multiple Regression	5	Jan 22nd
2	Spatial Sampling / Logistic Regression	5	Jan 29th
3	Spatial Autocorrelation / Spatial Regression	5	Feb 7th
4	Midterm Exam	30	Feb 7th
5	Factor Analysis	5	Feb 21st
6	Clustering	5	Feb 28th
7	Point Pattern Analysis	5	Mar 7th
8	Geostatistics	5	Mar 12th
9	Final Exam	35	Mar 16th

All assignments are due at 11:55pm on the specified due date above and should be uploaded to the blackboard site as a pdf file.

Graduate Individual Project: The graduate project will be a topic of your choosing and I would highly recommend that it compliment your thesis or dissertation. It will give you a chance to develop some of your data sources and analysis in a classroom environment and get some of the preliminary writing out of the way. Even if you are doing a project that is more qualitative in nature, you may be able to use statistics to help build your argument. A handout of the exact format of the project will be made available later in the quarter. In either case, the project should focus on the data collection, methods used, and explaining your analysis of the problem. **Your project will count for 30% of your total grade reducing emphasis on your midterm and final exam scores**.

Graduate Individual Project Deadlines and Information:

Item	Deliverable	Due Date	% of Project
Project Idea	1 Page description of what you want to do and why	Jan 24th	15
Project Outline & Flow Chart	Standard outline that maps the flow and expectations for your project.	Jan 31st	15
Final Report	10 page report with maps and analysis	Mar 16th	70

Academic Honesty: Academic dishonesty will not be tolerated. Although it is expected that students will help each other while working on the projects, what you turn in should reflect your knowledge, competence, and acquired skills. Anyone who turns in someone else's work as his/her own will receive a zero for the assignment, and may be reported to the Director of University Judiciaries for further action.

Disabilities: If you have a disability that may hinder your performance in the class please inform me at the beginning of the quarter.

Computer and Lab Use: You will need to use the computers outside of the regularly scheduled class time to work on projects and explore the functionality of the software. Dedicated lab times have been established for our class use; I will be present at this time to help answer your questions. You may use the computers at other times during the week except during designated lecture/lab times for other Geography courses (a schedule is posted on the lab door). The lab is not intended for general use, and entrance to the lab is restricted. To enter, punch in the last 6 digits of your PID and then press the * key (the keypad "beeps" with every button pushed). The green light will flash and the door will unlock. Do not leave the door propped open. Please see handout # 1 for additional information about logging on and computer lab use.

IMPORTANT: The computer lab is your resource for the quarter so please abide by its rules and limit your printing to class projects. Below are some basic tips to keeping your data safe and backed up. **Each student should strongly consider purchasing a 1GB or larger USB Flash drive. IPODS also work.**

1. Copy all your data and do all processing on your local machine. It is much faster and more reliable for data analysis.
2. When working on a local machine put your data in C:\Workspace
3. It might also be smart to back your data up on a flash drive as well
4. In doing the above, **MAKE SURE TO COPY ALL YOUR DATA BACK TO YOUR L: DRIVE** after working in the lab. The machines may be gutted at anytime so any work that is not backed up to the L drive will be lost.

Additional Readings (found on blackboard site under course documents)

1. Sanchez, T.W., *The connection between public transit and employment - The cases of Portland and Atlanta.* Journal of the American Planning Association, 1999. **65**(3): p. 284-296.
2. Kanda, L.L., T.K. Fuller, and P.R. Sievert, *Landscape associations of road-killed Virginia opossums (Didelphis virginiana) in central Massachusetts.* American Midland Naturalist, 2006. **156**(1): p. 128-134.
3. Voss, P.R., et al., *County child poverty rates in the US: a spatial regression approach.* Population Research and Policy Review, 2006. **25**(4): p. 369-391.
4. Kodras, J.E., J.P. Jones, and K.F. Falconer, *Contextualizing Welfares Work Disincentive - the Case of Female-Headed Family Poverty.* Geographical Analysis, 1994. **26**(4): p. 285-299.
5. Ackerman, W.V., *Socioeconomic correlates of increasing crime rates in smaller communities.* Professional Geographer, 1998. **50**(3): p. 372-387.

6. Dyer, J.M., *Revisiting the Deciduous Forests of Eastern North America.* Bioscience, 2006. **56**(4): p. 341-352.
7. Wing, M.G. and J. Tynon, *Crime mapping and spatial analysis in national forests.* Journal of Forestry, 2006. **104**(6): p. 293-298.
8. Ustrnul, Z. and D. Czekierda, *Application of GIS for the development of climatological air temperature maps: an example from Poland.* Meteorological Applications, 2005. **12**(1): p. 43-50.
9. Liu, X.M., J.J. Wu, and J.M. Xu, *Characterizing the risk assessment of heavy metals and sampling uncertainty analysis in paddy field by geostatistics and GIS.* Environmental Pollution, 2006. **141**(2): p. 257-264.
10. Mowrer, H.T., *Propagating uncertainty through spatial estimation processes for old-growth subalpine forests using sequential Gaussian simulation in GIS.* Ecological Modelling, 1997. **98**(1): p. 73-86.