

GEOG 407/607

Advanced GIS Analysis

Lecture: MS 227, Tuesday & Thursday 5:30 – 6:45

Lab: MS 222, Thursday 2:00 – 4:45

Instructor: Quinn Korbolic

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Office Hours: T 3:00 – 4:00p, W 3:00 – 4:00p

or by appointment

Course Description:

The course will cover various spatial statistics, advanced spatial analysis, and other advanced topics in GIS such as process models (model builder), geodatabases, and python scripting. The goal of the class will be to bridge the gap between advanced GIS methods (like python scripting or model builder) and advanced concepts/analysis. You will be expected to complete a final project that integrates methods and tools you have learned in this class within your own area of interest or expertise. It is important that you have passed the prerequisite for this course, GEOG 405/605, or have qualifying experience, as we will use little time to review introductory GIS concepts and methods.

Texts:

Only the first text listed below is required, all others are **optional**. The ESRI Guide to GIS Analysis, Volume 2: Spatial Measurements and Statistics, can be purchased [here](#) (from ESRI Press) for \$35. You may be able to purchase this book elsewhere, e.g. Amazon, for less \$. Please purchase the book during the first week of class as readings will be assigned from the book during the third week. Let me know if you have trouble purchasing your copy. There is one copy of the ESRI Guide on reserve in the DeLaMare Library. Volume 1 of the ESRI Guide to GIS analysis is also in the DeLaMare Library if you need to brush up on some GIS concepts.

ESRI Guide to GIS Analysis, Volume 2: Spatial Measurements and Statistics

Andy Mitchell, 2005. ESRI Press. ISBN: 9781589481169

Optional Texts:

Geographic Information Systems and Science

Longley, Goodchild, Maguire, and Rhind, 2005, **Second Edition**, John Wiley and Sons
ISBN: 0-470-87000-1

Modeling Our World

Michael Zeiler, 2010, ESRI Press, **Second Edition**
ISBN: 9781589482784

Spatial Statistical Data Analysis for GIS Users

Konstantin Krivoruchko, 2011, ESRI Press
ISBN: 9781589481619

Learning Outcomes:

- * Broaden base of GIS theory learned in previous courses or professional work.
- * Build entry points into GIS literature covering selected topics in GIS research and practice.
- * Rethink Characteristics of spatial data and analysis procedures.
- * Learn to better use GIS technology efficiently and effectively.
- * Broaden knowledge of ArcGIS 10 including the use of spatial statistics, advanced geoprocessing, and modeling.
- * Apply methods learned in class to problem solving and project completion and work towards professional level GIS skills.

Grading:

GEOG 407

Labs: 30%
Article Reviews (3): 10%
Quizzes (3): 30%
Final Project: 30%

GEOG 607

Labs: 25%
Article Reviews (3): 10%
Quizzes (3): 30%
Final Project: 35%

Guidelines for final projects and article reviews are posted on WebCampus and the course website.

Late assignments will be accepted but will be docked a letter grade for each week an assignment is late. For example, if you turn in an assignment a day late it will be docked a letter grade because was turned in during the first week after it was due.

Graduate Student Requirements:

In order to receive graduate credit for this course, significantly more work is required. Graduate students will be required to answer additional questions on quizzes and complete a research paper for their final project. Requirements for the research paper are detailed on the course website and WebCampus.

Cheating & Plagiarism:

Any cheating or plagiarism will be ***severely punished***, ranging from failing the exam or assignment at a minimum to failing the course. Students who are caught cheating also lose their chance at college scholarships. Cheating includes both copying someone else's work as well as letting your work be copied, bringing in notes, text messaging or taking pictures of the exam, plagiarizing other people's words or ideas and passing them off as your own, etc. [University of Nevada academic dishonesty policy](#).

Students with Disabilities:

Any student who qualifies with a disability is to provide his or her instructor with a letter from the Disability Resource Center stating the appropriate accommodations for this course. If you have a documented disability and wish to discuss how these academic accommodations will be implemented for this course, please contact the instructor during the first two weeks of class.

Course Schedule¹:

Quizzes & Assignments Due are highlighted in red

Review sessions are highlighted in blue

Week	Date	Topics	Reading	Optional Reading
1	August 30	Course Introduction: Syllabus, Course Schedule, Lab Overview, Article Reviews, Final Projects, Meet n' Greet , Diagnostic-test		Gould – Expose yourself to geographic Research
	Sept. 1	Diagnostic Test Review, Getting Help in ArcGIS and Python Lab 1: ArcGIS refresher	Explore ArcGIS 10 Online Help	Longley: Chapter 12 (Cartography refresher)
2	Sept. 6	Misc. GIS review & GeoDB intro	Zeiler: Chapter 1	
	Sept. 8	Geodatabase design & Construction In Class Exercise Lab 2: Build a Geodatabase		
3	Sept. 13	Geoprocessing – Model Builder/Python	Zeiler: Chapter 11	
	Sept. 15	No Lab/Class		Geoprocessing In ArcGIS: 1, 8, & 9
4	Sept. 20	Geoprocessing - Python Due: Article Review #1		Writing Geoprocessing Scripts
	Sept. 22	Geoprocessing - Python Lab 3: Model Builder/Python		
5	Sept. 27	Analysis Models		Landslide Susceptibility
	Sept. 29	Spatial Measurements and Statistics Quiz Review Lab 3 continued: Model Builder/Python	Mitchell: Ch. 1	
6	Oct. 4	Measuring Geographic distributions Quiz 1	Mitchell: Ch. 2	Burt: Ch. 3
	Oct. 6	Identifying Patterns Lab 4: Geographic distributions/patterns	Mitchell: Ch.3	
7	Oct. 11	Identifying Clusters	Mitchell: Ch.4	
	Oct. 13	Geographic Relationships Lab 5: Clusters		
8	Oct. 18	Geographic relationships Due: Article Review #2	Mitchell: Ch.5	Krivoruchko: Ch. 12
	Oct. 20	In Class Exercise Lab 6: Geographic Relationships		
9	Oct. 25	Third Party GIS/UI customization		
	Oct. 27	Raster Data & Interpolation Discuss project proposals	Handout: Burrough Ch.5	

¹ This schedule is subject to change.

Week	Date	Topics	Reading	Optional Reading
	Oct. 27	Due: Project Proposal Quiz Review Lab 7: Third Party GIS/UI customization		
10	Nov. 1	Raster Data and Interpolation Quiz 2	Krivoruchko: Chs. 1 & 8	
	Nov. 3	Geostatistical Analyst - kriging Lab 8: Spatial & Geostatistical Analyst		
11	Nov. 8	Data – Where is it? Data Error & Uncertainty	Krivoruchko: Ch.3	
	Nov. 10	Open Lab – Work on your projects		
12	Nov. 15	Ethical GIS Due: Article Review #3		
	Nov. 17	Open Lab – Work on your projects		
13	Nov. 22			
	Nov. 24	Thanksgiving Day!		
14	Nov. 29	Intro to open and Web/Server GIS		
	Dec. 1	Open Lab - Work on your projects		
15	Dec. 6	An application of GIS and geoprocessing Quiz Review		
	Dec. 8	Quiz 3 Open Lab – Work on your projects		
16	Dec. 13	Due: Draft poster Meet to critique/discuss draft posters.		
	Dec. 14	Prep Day		
	Dec. 19	Final – Project Presentations		

Grading Breakdown	Points	
	407	607
Lab 1	30	20
Lab 2	50	40
Lab 3	50	50
Lab 4	30	25
Lab 5	30	25
Lab 6	40	30
Lab 7	30	20
Lab 8	40	40
Article Review 1	33	33
Article Review 2	33	33
Article Review 3	34	34
Quiz 1	100	100
Quiz 2	100	100
Quiz 3	100	100
Final Project	300	350
Total:	1000	1000