GRG 368C: GIS & Spatial Analysis
Spring 2013 T-Th 2:00 – 3:30 CLA 1.108

Instructor: Dr. Jennifer A. Miller **Email:** jennifer.miller@austin.utexas.edu

Office: CLA 3.428 **Office hours:** T-Th 3:30-4:30, or by appt.

Book: O'Sullivan, D. and Unwin, D. (2010, 2nd ed). Geographic Information Analysis, Wiley (**required)**. Mitchell, A. (2009) The ESRI Guide to GIS Analysis, Volume 2: Spatial Measurements and Statistics (**recommended)**. Additional readings will be available on Blackboard.

Online resources: Class assignments, lecture outlines, and additions/modifications to the class schedule will be posted on the class Blackboard site and it is your responsibility to check it **weekly**! Additional required and recommended readings that supplement the course material will also be provided there. We will also use the **discussion board** on the course Blackboard site for questions or comments about both the lecture and the assignments.

Prerequisites: GRG 360G or equivalent introductory GIS course. Students **must** be familiar with GIS fundamentals and ESRI ArcGIS software. Previous coursework in statistics will be useful.

Course description: In this course we will explore in greater depth and breadth spatial analysis concepts introduced in GRG 360G (or similar intro GIS course). The course addresses 'spatial problem solving' by focusing on both the theoretical/conceptual and practical aspects of GIS modeling and spatial statistics. This class does not have a formal computer lab session but the exam, final project, and most of the assignments will require significant GIS analysis to be performed in a campus computer lab or on your own computer (see me if you would like a 1 year student copy of ArcGIS software (v.10)).

Grading Policies:

- All assignments/exam/report are due at the **beginning of class** on the date assigned and will be considered late if turned in after 2 pm. Students have 1 week to submit late assignments for half credit. The final project will not be accepted after the due date (May 10 at 5 pm).
- Final grades will be calculated using the following thresholds: 90.0 (A), 80.0 (B), 70.0 (C), 60.0 (D), below 60.0 (F).

Task	Percentage of Final Grade
Article report	10
Exam	22.5
Class assignments	22.5
Final project	40
Class interaction	5

Tentative class schedule (Chapters listed refer to the O'Sullivan book, TBA refers to additional readings that will be distributed in class or made available on Blackboard).

Week	Topic	Readings	Deliverable
1	Class overview; data models review	Ch. 1	
2	Basic concepts in spatial analysis	Ch. 2	
3	Pitfalls/potential of spatial data; pattern & process	Ch. 4	
4	Point pattern analysis (PPA)	Ch. 5	
5	PPA, cont'd.	Ch. 6	
6	Spatial autocorrelation analysis	Ch. 7	Project prospectus due Feb. 21
7	Local vs. global statistics	Ch. 8	
8	Cont'd.		Article report due Mar. 7
9	***Spring Break***		
10	Regression (OLS & GWR)	TBA	Updated prospectus due Mar. 21
11	Cont'd.		
12	Implementing models in GIS	Ch. 11	
13	TBA (exam)		Exam due Apr. 11
14	Wrap-up, Student presentations		~10 min. oral presentation
15	Student presentations		cont'd.
16	cont'd.		cont'd.
Exams	---		**Final project due Friday May 10 by 5 pm**

Notes on conduct in a college classroom: *Every student has the right to learn as well as the responsibility not to deprive others of their right to learn*. To that end, please follow these guidelines:

- Be on time to class and don't leave early. Late arrivals and early departures are very disruptive to other students and the instructor.
- While attendance will not formally be taken, it will be difficult to do well in this class if you don't attend and/or if you are late. Attendance and participation are used to calculate your class interaction score. In addition, some assignments will be performed during the beginning of class.
- Please let me know if there are any distractions or other issues that I may not be unaware of that are preventing you from performing satisfactorily in this class.
- Please turn off cell phones. Please turn off cell phones. **Please turn off cell phones**.
- **NO use of portable electronic devices during class.**

Notes on internet use:

- The internet can be a great source of information, but there is no quality control, as there is with (most) books and journals. You should examine internet sources very critically before using them. Generally, the most reliable sources for data and information are large government agencies or recognized professional organizations (and not wikipedia). The internet has also made plagiarism very easy. **Make sure you cite any sources** you use in assignments appropriately. If you copy something directly from the internet (or any other source), it is plagiarism, and will not be accepted.

Official UT stuff:

Documented Disability Statement

Students with disabilities who require special accommodations need to get a letter that documents the disability from the Services for Students with Disabilities area of the Office of the Dean of Students (471-6259 voice or 471-4641 TTY for users who are deaf or hard of hearing). This letter should be presented to the instructor in each course at the beginning of the semester and accommodations needed should be discussed at that time. Five business days before an exam the student should remind the instructor of any testing accommodations that will be needed.

See website below for more information: http://deanofstudents.utexas.edu/ssd/providing.php

Religious Holidays

Religious holy days sometimes conflict with class and examination schedules. If you miss an examination, work assignment, or other project due to the observance of a religious holy day you will be given an opportunity to complete the work missed within a reasonable time after the absence. It is the policy of The University of Texas at Austin that you must notify each of your instructors at least fourteen days prior to the classes scheduled on dates you will be absent to observe a religious holy day.

The University of Texas Honor Code

The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

Basic information on final project for GRG 368C: GIS & Spatial Analysis

Each student will work on an individual project that addresses several topics we will have covered this semester. The components of the project (with relevant dates) are:

- Project prospectus: Must have a **research question,** expected **spatial information product** (SIP), study area, draft flowchart/outline (with data and methods), and include 4-6 key references. **Due Feb. 21**.
- Project must incorporate at least **three different spatial statistical methods** discussed in class (ex., PPA, Moran's *I*, LISA, regression, GWR) **and** include an investigation of the **effects of scale** on one of the methods.
- Project update: **Updated** prospectus with *firm* flowchart/outline (with data sources 'in hand' and appropriate methods identified) and at least 10 references. **Due Mar. 21**
- Student presentations: Each student will describe their project to the class in a ~10 minute PowerPoint (or similar) presentation. Presentations **start Apr. 18** (and continue through the last week of class) and will consist of:
    - Introduction/Research question
    - Data and Methods, including flowchart
    - Results, including SIP
    - Conclusions, problems, recommendations
- Written Project is **due by 5 pm on Friday, May 10**. Project should be ~12-17 pages, double-spaced and contain the following (grading rubric will be available on Blackboard):
    - Background/lit review
    - Research question and its significance
    - Methodology (data details, methods used—be specific!)
    - Results, including SIP, and supplementary maps, charts, tables…
    - Discussion, including conclusions, recommendations
    - References cited (including data sources)

I expect that you will have experience writing a basic research paper, but also recommend that you visit the Undergraduate Writing Center for advice or guidance on the process of writing a scientific paper.

Components of final project grade (40% of final grade):

1st prospectus	5%
2nd prospectus	10%
Presentation	40%
Paper	45%