Environmental Geographic Information Systems

Spring 2011 T-Th 12:30 – 2:00 GRG 102

Instructor: Dr. Jennifer A. Miller	**Email:** jennifer.miller@austin.utexas.edu
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TA: Jennifer Alexander **Office hours:** Tue 11-12; Wed 11-12:30	**Email:** jalexander@austin.utexas.edu
Labs: Mon 9:00-11:00 OR Mon 1:00-3:00 OR Wed 9:00-11:00 OR Wed 1:00-3:00 **GRG 206**	

Book: Geographic Information Systems and Science by Longley, Goodchild, Maguire, and Rhind (2nd edition), Wiley Press. 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 available here. We will also use the **discussion board** on the course Blackboard site for questions or comments about both the lecture and the labs.

Prerequisites: While there is no formal prerequisite for GRG 360, students are expected to be computer proficient and familiar with file management and basic software applications such as word-processing, spreadsheet and graphic creation/editing (windows environment). If your skills are lacking in any of these areas, I would encourage you to take advantage of the short courses, tutoring, and web resources available at UT.

Course description & outcomes: This course introduces basic concepts underlying geographic information systems and science (GIS), including related or integrated technologies and applications such as global positioning systems (GPS), cartography, remote sensing, and spatial analysis. It combines an overview of the general principles of GIS with a theoretical treatment of the nature and issues associated with the use of spatial environmental information. Although the course has a laboratory component that introduces students to the most commonly used GIS software package, the focus is on the "science behind the software" (eg, types and implications of functions and analysis, rather than just how to do the analysis). By the end of the course, students should be able to:

- Understand the geographic information technologies and processes involved in creating, deriving, collecting and organizing geographic data and information;
- Develop an understanding of 'spatial reasoning' and how it used to address, conceptualize and solve geographical problems;
- Synthesize and integrate concepts of GIS theory and methodology, including data models, data structures, topology, and spatial analysis;
- Understand and articulate what geographic information science is and some of its topics and challenges;
- Begin to articulate the role of space as a source for explanation and understanding;

- Understand the importance of analysis in GIS—how/why it's done, issues associated with analysis and the data involved;
- Understand the use of models as an abstraction of reality;
- Demonstrate basic GIS software skills, as well as basic scientific computing skills.

Quantitative Reasoning flag: *This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.*

Grading Policies:

- Grades will be based on 2 exams during the semester (20% each), lab assignments (13%), a lab practical (12%), a cumulative final exam (25%), in/out class assignments (8%), and class interaction (2%).
- Students should be prepared to discuss the assigned readings/topics in class. Class interaction entails answering questions in the beginning of each class, as well as participating appropriately in class discussions. In addition, 8% of the final grade will be based on short assignments, some of which will take place in class.
- Late assignments may be turned in within one week of the due date for half credit. **NO assignments will be accepted more than 1 week after the due date**.
- 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).
- Everything discussed or presented in class can potentially be on the exams. That includes lectures, relevant portions of the book, additional readings, guest lectures, and videos…
- If you have a **documented excused absence** for either regular exam **and provide it to me before the exam**, you will be allowed to take an essay make-up exam within one week of the scheduled exam date.
- **There will be no make-up exam for the final and it may not be taken at an alternative time for any reason.**

Task	Percentage of Final Grade
Exam 1	20
Exam 2	20
Lab assignments	13
Class assignments	8
Lab practical	12
Final exam	25
Class interaction	2

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

Week	Topic	Readings
1	Class overview Introduction to and history of GI technologies	Preface, Ch. 1, Nature article
2	Data models and conceptualization of 'space'	Ch. 3
3	Data models, cont'd.	Ch. 8
4	Properties of geographic data (what's so special about spatial data?)	Ch. 4
5	Geographic data, cont'd; **Feb. 17: Exam #1**	
6	Uncertainty…	Ch. 6
7	'You are here': Projections & coordinate systems Data collection	Ch. 5 Ch. 9
8	Intro to remote sensing & GPS Geovisualization Geographic databases	additional RS reading Ch. 13, 10
9	SPRING BREAK	
10	Spatial analysis I: search & measure Terrain measurement	Ch. 14 Berry article
11	Spatial analysis II: statistics Spatial regression demo	Ch. 15, Ch. 4 (101-104)
12	Spatial analysis III: GIS modeling	Ch. 16
13	**Apr. 12: Exam #2,** TBA	
14	GIS modeling, cont'd., GIS applications/case studies	Ch. 2
15	Legal, privacy, and ethical issues	(Ch. 19: 425-431; Ch 20: 459-470; Ch 11: 250-259)
16	Wrap-up/catch-up, exam review	TBA, epilog
May 14	**FINAL EXAM 2pm – 5pm Saturday**	

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.
- 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 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). Obviously personal web pages and those produced by special-interest organizations should be treated with caution.
- The internet has also made plagiarism very easy. Make sure you cite any sources you use in assignments, and re-phrase information that you use. 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.