Introduction to Geographic Information Systems

Georgia Southern University
GEOG 3430, Spring 2006

INSTRUCTOR INFORMATION

Instructor: Dr. Wei Tu
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Tel: 912-681-5233
Office Hours: Monday 1:00-5:00 pm
Tuesday 4:00-5:00 pm
Wednesday 4:00-5:00 pm
Or by appointment

Lab Assistants
Kevin Kinsler
Email: kevin_e_kinsler@GeorgiaSouthern.edu
Femi Okanla
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Extended Lab Hours: Monday 6:30-9:30 pm
Tuesday 6:30-9:30 pm
Wednesday 6:30-9:30 pm
Thursday 6:30-9:30 pm

MEETING TIME AND LOCATIONS

LECTURES
Tuesday and Thursday
10:00-10:50 am
3001 Math/Physics Bldg

LABS
Session A: Wednesday, 2:00-3:50 pm
Session B: Friday, 9:00-10:50 am
2204 IT

THE NATURE OF THE COURSE

This 3-credit hour course is an introduction to the principles, techniques, and applications of Geographic Information Systems (GIS). It combines lectures with a substantial practical component. The lectures cover the concepts of map projection, spatial data models, technical issues in GIS data acquisition, data storage and retrieval, georeferencing, spatial and attribute query, and basics of both raster and vector based GIS analyses. The practical component, including twelve lab assignments, will give students hands-on experience in using popular GIS software to handle geo-spatial information and to produce maps.

LEARNING OUTCOMES

Students, given the completion of the course requirements, will be able to: (1) explain basic concepts and principles of GIS; (2) gain hands-on experience of using GIS software

to conduct basic spatial analysis and to make maps; and 3) be aware of the potential applications of GIS in real world settings.

TEXTBOOK

REQUIRED

Chang, K. T. 2006. **Introduction to Geographic Information Systems**. 3rd edition, McGraw-Hill, 432 pp.

Price, M. H., 2006. **Mastering ArcGIS.** 2nd edition, McGraw-Hill, 580 pp.

NCGIA 1990. **NCGIA Core Curriculum in GIScience** http://www.geog.ubc.ca/courses/klink/gis.notes/ncgia/toc.html

ADDITIONAL READINGS

DeMers, M. N. 2000. **Fundamentals of Geographic Information Systems**, 2nd Edition, John Wiley & Sons, Inc., 498pp.

Clarke, K. 2000. **Getting Started with Geographic Information Systems**, 3rd Edition, Prentice Hall, 340 pp.

Burrough, P. and R. McDonnell. 1998. **Principles of Geographic Information Systems,** Oxford University Press, 333 pp.

OTHER REQUIRED MATERIALS

One external storage media with 512 M or above storage capacity. Please also prepare a notebook for both lecture and lab sessions.

COURSE REQUIEMENTS

ATTENDANCE: I expect you to attend lectures (in both body and mind), although attendance will not be taken formally in class. If you miss class, it is your responsibility to get the notes from a classmate. I will not make my notes available to students under normal circumstances. Class participation will be rewarded. Students who answer a question in class will **be awarded five "quiz points."** These points will be added toward students' total quiz point to calculate the final grade at the end of the semester.

CLASSROOM ETIQUETTE: Students are expected to refrain from eating, drinking, talking, sleeping, making or receiving phone calls, and reading materials that are unrelated to the course while the class and the lab are in session. Eating and drinking in the lab are strictly prohibited. Violators may risk being stripping off the privileges of using the lab. If you have to arrive late or leave early for a lecture, please sit at a seat closest to the door to minimize your disturbance to others.

EXAMS: All students are required to take three close-book exams. Missing an exam will result in a grade of 0 points. The only acceptable excuses for missing a test are those related to serious personal illness, a family emergency, or official school business (or any other kinds of **university-excused** absences). The reason for the absence must be

documented in writing from an appropriate source, such as your physician. If you must be absent when an examination is scheduled, let me know as early as is possible. Do not wait until after the examination is given. In virtually all circumstances no make-up will be offered. If a student is excused from an examination, that test will not be considered in determining the student's final grade.

QUIZZES: There will be 12 quizzes throughout the semester. The intent of these quizzes is to see if the class is understanding the lecture material and to ensure that students are keeping current in their study. These quizzes may not be made up if you are late or absent. Quiz will cover the reading listed in the syllabus for the previous week in which the quiz is given. The quizzes will also be composed primarily of objective questions (multiple-choice and true-false). Always **read according to the schedule** in the syllabus even if I get a bit ahead or behind in class. In general, quizzes will be given during the first 10 minutes of class on Tuesdays, but at least two quizzes will be given on Thursday.

LABORATORY ASSIGNMENTS: All students are expected to fulfill all the requirements of lab exercises. At the beginning of each new lab session, a lab handout will be given followed by general instructions by the instructor. Students are expected to read and understand the handout before they start to work on the assignment and to remain in the lab for the full two-hour period or until the exercise is completed. Although students will be able to complete some of the lab exercises during class time, they will mostly likely to spend time outside class. Thus the extended lab hours that are maintained and supervised by the lab assistants will be provided weekly in addition to the official lab hours.

Please also **notice** that the loss of data due to disk damage, failure, or misplacement will not be accepted as a reason for grade alteration or deadline extension. Routine data backups are recommended for your own protection.

GRADING: A total of 1000 points may be earned for this course. The final grades will be assigned on the scale of A (> =90%), B (80 – 89%), C (70 – 79%), D (60 – 69%), and F (< 60%). The cut-offs for final grades will almost certainly be a few percentage points less than these values. However, the 50% rule for failing grades is absolute. You will not pass the course unless you earn at least half of the available points. Contributions to the grades will be weighted as follows:

	Points (Undergraduate)	**Points (Graduate)**	**Note**
Exam 1	150	150	Non-cumulative
Exam 2	150	150	Non-cumulative
Final	150	150	cumulative
12 Labs	500	400	Only 10 highest grades count toward the final grade
12 Quizzes	50	50	Only 10 highest grades count toward the final grade

Term paper		100	See instructor for details
Total possible		**1000**	

UNDERSTANDING GRADES

Grades reflect effort and achievement, not effort alone. The descriptions below attempt to define some of the differences between a truly outstanding student, an average student and a failing student.

LATENESS POLICY: Turning in assignments promptly is important both for keeping current with the subject matter of the class and to keep all students on level playing fields. As such, this class will adopt strict grading policy towards late lab assignments. **All assignments must be submitted on the assigned due date in order to receive credit.**

Requests for extensions due to extenuating circumstances will be considered on a case-by-case basis, but please do not count on such requests being granted.

THE USE OF WEBCT AND EMAIL

WEBCT: WebCT is used in this class to post lecture notes, grades, and important announcements. It is essential for you to obtain an ID and password of WebCT. Please contact with Center for Excellence in Teaching (CET) to learn how to access and use WebCT should you have any questions about it. Tel: 912-486-7471. http://academics.georgiasouthern.edu/dlc/webct/student.php.

EMAIL: If you would like to send me an email message, you **must** send it from your **Georgia Southern University account**. It is **your responsibility** to regularly check your email and browse WEBCT pages in order to get most updated information about this class.

SCHOLASTIC DISHONESTY

Please read the university Student Conduct Code on scholastic dishonesty carefully. Cheating and plagiarism are serious offenses, they will not be tolerated. Academic dishonesty will not be tolerated in this class. The minimum penalty for cheating will be a zero grade for the test or assignment on which the cheating occurred. Unless specific written exceptions are stated, all tests will be "closed book," meaning that no form of written or electronically stored information can be used. Furthermore, although students will be encouraged to work together in the laboratory, the reports submitted should be their own work, written in their own words. If you are unsure what constitutes plagiarism, please see me.

"Prefer a loss to a dishonest gain; the one brings pain at the moment, the other for all time" –Chilton

COPYRIGHTS

The materials used in this course are copyrighted. By "materials," I mean everything prepared and used for this class, which includes but are not limited to syllabus, lecture notes, quizzes, exams, in-class materials, review sheets, and the project guideline. Because these materials are copyrighted you do not have the right to copy them, unless I personally grant permission

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STUDENT SERVICE

The American with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Student Disability Resource Center (SDRC). Tel: 912-871-1566 or visit their website: http://students.georgiasouthern.edu/disability/

SUCCESS IN THIS CLASS

1. Active Participation: Do not miss class. Try to take notes to whatever extent you are comfortable.
2. Text Book Reading: Catch up with the reading assignment. Fill in the blanks in your class notes while you are reading. Pay particular attention to those materials that are emphasized in the lectures; and re-read those portions of the materials that are not covered in your notes.
3. Lab Assignments: Please frequently save/back up your files when you are working on labs to avoid data loss, pay more attention about basic GIS concepts than technical details and learn to seek helps from help files and online sources.
4. Ask Questions: Never hesitate to ask questions. Do not wait until it is too late.

SOME IMPORTANT DATES

1/9: First day of class
1/9-12: Drop/Add
1/16: Martin Luther King Holiday, no class
1/17: Attendance Verification deadline
2/24: Mid-semester grades for freshmen due in Registrar's Office by noon.
3/6: Last day to withdraw without academic penalty
4/30: Last day of class
5/2: Final exam

TENTATIVE COURSE SCHEDULE AND TOPICS

Week	Lecture Topics	Readings	Lab Exercises
1 1/10 1/12	GIS: Concept and brief history	Chapter 1 NCGIA Unit 2	**1. Getting to know ArcGIS** Price: p. 19-56
2 1/17 1/19	Basics of Cartography	Chapter 10 NCGIA Unit 20	**2. Getting to know ArcMap** Price: p. 63-74
3 1/24 1/26	Map Projection and Coordinate Systems	Chapter 2 NCGIA Unit 13-16	**3. Making maps with ArcMap** Price: P.139-49 P.301-12 Tu: supplemental handouts
4 1/31 2/2	Raster Data Structure	Chapter 5 NCGIA Unit 4/55/57	**4. Explore Map Projections** Price: P.105-18 Chang: p.38-41
5 2/7 2/9	Georelational Vector Data Model	Chapter 3 NCGIA Unit 13/14	**5. Raster Data Model** Chang: 92-94
6 **2/14** 2/16	**Exam 1**		
7 2/21 2/23	GIS Data Sources and GPS Basics	Chapter 6 NCGIA Unit 17	**6. Explore Data Sources on the World Wide Web** Tu: supplemental handouts
8 2/28 3/2	Spatial Data Digitizing and Editing	Chapter 8	**7. On-screen Digitizing and Editing** Chang: p.113-16;
9 3/7 3/9	Geometric Transformation **Out of town for conference, no class on 3/9**	Chapter 7	**8. Geometric Transformation** Chang: p. 128-31
10 (3/13-17)	Spring Break, no classes		
11 3/21 3/23	Attribute Data Management	Chapter 9 NCGIA Unit 45	**9. Working with Non-spatial Attribute Tables** Chang: p.171-74 Price: p. 177-89
12 3/28 **3/30**	**Exam2**		
13 4/4 4/6	Queries in GIS	Chapter 11	**10. Spatial and Non-spatial Queries** Chang: p. 223-28 Price: P. 217-26
14 4/11 4/13	Vector based GIS Analysis	Chapter 12 NCGIA Unit 14	**11. Vector-based Analysis** Tu: supplemental handouts
15 4/18 4/20	Raster based GIS Analysis	Chapter 13	**12. Raster Model and Analysis** Chang: p. 267-69 Price: p. 529-34
16 4/25	Trends in GIS Final Review	NCGIA Unit 135	
17 **May 2**	**Final Exam** (10:00 am -12:00 noon)		