Geog418: Introduction to GIS
Fall 2011 Course Syllabus

AH 1320
3:30 – 4:45 p.m.TR

Instructor: Dr. Shunfu Hu
Office: AH1413 Telephone 650-2281
Office hours: 10:00 – 11:00 a.m. TR
or by appointment (shu@siue.edu)

Course Materials:

Textbook: Introduction to Geographic Information Systems edited by Chang (6th ed.)

and

Lab manual, in-class handouts, and journal articles

GIS Software: Erdas Imagine 10, and ArcGIS 10

Introduction and Course Objectives

Geographic information system (GIS) represents the latest technology that is revolutionizing the discipline of geography. GIS has been extensively utilized as an automated system for the capture, storage, retrieval, analysis and display of geographically-referenced data. GIS development is a result of the convergence of geographical ideas, computer technology, progressive social thoughts and mathematical algorithms. GIS technology has been used in the fields such as agriculture, forestry, geology, hydrology, urban planning, transportation, electric/gas routing, federal and local government, and environmental studies. As a result, a growing majority of geographers now believe that some degree of exposure to GIS is an essential part of geographic experience.

The purpose of this course is to explore the theoretical framework of vector and raster based geographic information systems, and apply that knowledge in a series of applications using Erdas Imagine and ArcGIS software packages. The goal in this approach is to acquaint you with the major functions of GIS using these preeminent software packages to obtain practical experience in GIS, and to make you fluent in GIS functions to the point where you are able to apply your knowledge.

Lecture/Lab Schedule

Date	Topics	Reading Assignment
Aug. 23	History of GIS, GIS definitions, and GIS applications	Ch. 1
Aug. 25	Lab 1: Introduction to ArcGIS 10, and Displaying Data in ArcGIS	Handout
Aug. 30	Nature of geographic data, map scale, map projection, and coordinate systems	Ch. 2
Sept. 1	Lab 2: Map Projections, and Determine and assign coordinate systems	Handout
Sept. 6	Understanding Datums and datum shifts Lab 3: Examine Ellipsoids and datum shifts	Ch. 2
Sept. 8	Cartographic and GIS data structure: vector data model Lab 4: vector data model: – topological data encoding	Ch. 3 Handout
Sept. 13	Cartographic and GIS data structure: raster data model	Ch. 4
Sept. 15	Data Formats Supported in ArcGIS Lab 5: Querying Data in ArcGIS	Ch. 5 Handout
Sept. 20	Analog-to-digital maps (digitizing and scanning)	Ch. 6
Sept. 22	Lab 6: Working with Spatial Data in ArcGIS	Ch. 7 Handout
Sept. 27	Image Rectification Lab 7: Scanning aerial photographs, and digital image rectification	Ch. 6
Sept. 29	Project 1: image rectification of scanned air photos	Handout
Oct. 4	Relational database management system (RDBMS) Lab 8: Relational algebra	Ch. 8
Oct. 6	Lab 9: Working with Attributes in ArcGIS	Handout
Oct. 11	Data display and cartography Lab 10: Presenting Data in ArcGIS	Ch. 9 Handout
Oct. 13	**Mid-term Exam**	
Oct. 18	GIS spatial analysis – Proximity, Adjacency and Containment Lab 11: spatial analysis: proximity, adjacency, and containment	Ch.10 Handout
Oct. 20	GIS spatial analysis – buffer and overlay Lab 12: Find suitable sites for a carpool parking lot	Ch.11 Handout
Oct. 25	GIS spatial analysis – geoprocessing Lab 13: Geoprocessing with ArcGIS	 Handout
Oct. 27	Project 2: Finding suitable areas for a new industrial site	Handout
Nov. 1	Project 2 *continues*	
Nov. 3	Project 2 *continues*	
Nov. 8	Project 3: GIS geodatabase development: digitizing and attributing	Handout
Nov. 10	Project 3 *continues*	Handout
Nov. 15	Project 3 *continues*	
Nov. 17	Project 4: GIS geodatabase development: geodatabase, feature classes and feature dataset	
Nov. 29	Introducing ArcGIS extensions –3D Analyst	Ch. 13 & 14
Dec. 1	Introducing ArcGIS extensions - Network Analyst Lab 14: Evacuation Modeling using ArcGIS Network Analyst	Ch. 17
Dec. 6	Introducing ArcGIS extensions - Utility Analyst	
Dec. 8	**Course Review**	
Dec. 13	**Final Exam**	2:00 – 3:40 p.m.

Course Grading System and Requirements

1) Grading

Item	Points
Mid-Exam	120
Final Exam	200
Lab Exercises/Projects	220
Total	540
Graduate Student Paper	60
Graduate Student Total	600

Grade	Undergraduates	graduates
A	> 486	> 540
B	432 – 485	480 - 539
C	378 – 431	< 479
D	324 – 377	
F	< 323	

2) Exams

Mid-term exam covers mainly lectures, reading assignments and conceptual parts of the GIS applications. The format for mid-term exam will include any combination of the following items: short answers, short essays and problem solving. Exam dates are provided in the "Lecture and Lab Schedule" section of this syllabus. These exams will be weighted toward lecture materials and reading assignments, but may integrate techniques from the lab exercises. The final exam will require that you integrate most of your learning up to the end of the course. The format for final exam will include **only** GIS applications – you will be given data sets and are required to use ArcGIS to perform spatial analysis and answer questions.

3) Lab Exercises

There are many lab assignments given throughout the semester. Details of the lab's content and special grading parameters will be provided with each assignment. The labs usually include the completion of hands-on exercises on the computers and an associated write-up. Any write-up should be typed with double space. Some of the common grading parameters include: attention to the questions, creativity, difficulty of the endeavor, appropriate design, and insightful analysis in the accompanying write-up.

Lab assignments must be turned in on time. **Late labs will not be accepted**. Lab due date will be given at the time of each assignment.

4) Graduate Student Paper Requirements

Graduate students must complete a paper on a pre-approved topic of any GIS application. This paper may be a survey paper of a GIS application, or, a research paper based on his/her own interest in GIS applications. This paper must be at least 10 pages in length (double space), and include a bibliography of at least 10 references. The paper is due at 2:00 p.m. on Tue**sday**, **December 13, 2011**.

5) Attendance

Students need to come to class on a regular basis to master the course materials. Attendance will be taken regularly. **Each student is allowed one absence**, after which 20 points are deducted from the final score. The only exception to this rule is if the second or subsequent absence is an "“excused absence” as listed in the Course and Academic Advisement Policies under part B, “Course Attendance”, in the 2009-2010 Undergraduate Bulletin.

6) Make-up Policy

Students must take all exams at the designated times. You must contact me as early as possible to reschedule an exam. A make-up will only be given for an excused absence (see #4 above). If you don’t come and see me or call me within one class day of the missed exam, the grade for that exam will be zero. Regardless of total points, you must take all the exams to pass this course.

7) Professionalism

This is the ability to positively and professionally engage yourself in a laboratory setting. This includes proper use and care of the lab and materials, cooperation with partners in your group when group efforts are required, helping each other in learning GIS software, and sharing computer time if necessary. In addition, it includes completing any in class assignments in a timely fashion. Although I generally do not move students “up” when it comes grading time, a 89.9% will be an “A” if the attendance and professionalism points have not been deducted.

8) Academic Honesty

Cheating on exams or exercises can result in the failure of this course or the work in question. Refer to the student handbook if you have questions in this area.

Note: This syllabus is tentative and subject to change. You are responsible for knowing the course content and being aware of any changes in assigned due dates, dates of exams, labs etc.

Finally… Both theoretical and practical experiences in GIS are among some of the most important skills you can attain in this course. Some students may find the computer a little intimidating at first, but I am willing to work with you to get through any trouble spots that may occur. I am also committed to assisting those who want to progress further in the software packages that we will use. I am looking forward to working with each of you on an individual basis. Hope you will have an exciting and productive semester.

If you have any further questions, please feel free to contact me.