GIS Applications
GEOG 570 (16074)   Fall 2011-2012
5 credits   T Th 1:10-3:00
This course uses Blackboard   105 Clippinger

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Office Hours: T&Th3-4, F1-3, and by appt.   Office Hours: F 1-3

This course is an introduction to spatial analysis and mapping using computers. The majority of the class will be spent learning GIS (Geographic Information Systems), using ESRI's *ArcGIS* program. We will also go over basics of map use, cartographic design, remote sensing, and learn of some common sources of data for geographic applications. Since GIS links "information to geography," we will also briefly cover data manipulation using *Microsoft Excel*. It is envisioned that you will use the skills learned in this course throughout your program of study at Ohio University, and beyond. The goal of the course is not so much to master each application, but to understand the fundamentals of computer mapping and spatial analysis, and to develop an awareness of tools that are available for subsequent projects you may encounter.

Text: This class relies heavily on class "handouts" (available on Blackboard); there is no required text for the course. If you wish to purchase one, I would recommend either of the following. (Appropriate readings and practice problems from each are provided on the course schedule.)
- *Mastering ArcGIS* (4^(th) ed.) by Maribeth Price. McGraw-Hill, 2010. This is a more in-depth treatment, with background concepts and theory. It also has many practice problems.
- *Getting to Know ArcGIS Desktop: The Basics of ArcView, ArcEditor, and ArcInfo, Second Edition Updated for ArcGIS 9.3,* by Tim Ormsby, Eileen Napoleon, Robert Burke. ESRI Press (2008). This has a lot of step-by-step instructions, and is largely geared toward learning the ArcGIS software, similar to our in-class activities.

Student Expectations:
Seventy percent of success in life is showing up - Woody Allen. Since this course relies heavily on in-class demonstrations and project work, punctuality and attendance for the entire period is critical. Attendance is required on the first day. Unless other arrangements have been made in advance, final course grades will decrease by 5% for each absence after the first two. If for some reason you can't get to class on time or must leave early, please extend the courtesy of informing me beforehand. If any topic is unclear after lecture, please do not hesitate to see me as soon as possible. If you are unable to attend any class (e.g., because of an OU-sanctioned activity), please notify me ASAP. You will be held responsible for all material covered in class, and deductions will be imposed for projects turned in late (⅓-letter grade per day). If you do miss class, you should make every effort to contact me before the next class period, so that you can catch up on the missed material. No "extra" credit is available, and all projects must be completed to pass the course.

Classroom etiquette: Turn off monitors during lectures. If I preface a comment with something like "If I may have everyone's attention for a moment…," please provide me your attention. During class time, computers are only to be used for in-class exercises. Turn off your cell phones during class, and no texting.

A considerable amount of class time will involve "hands-on" activity. However, you will need to review concepts and work on projects outside of scheduled class times. You may use the computers at other times during the week except during designated lecture/lab times for other Geography courses; it is possible to use ArcGIS in other labs on campus, and you may also obtain from me a 1-year student copy of ArcGIS on DVD. Keep in mind that the purpose of this class is not to provide you with step-by-step instructions to solve each assignment, but to encourage you to use problem-solving skills in applying the information you learn to new challenges.

The lab is not intended for general use, and entrance to the lab is restricted. To enter, punch in the last 6 digits of your PID and then press the * key (the keypad "beeps" with every button pushed). The green light will flash and the door will unlock. Do not leave the door propped open.

Students are encouraged to purchase a flash drive (ideally, at least 1 GB) to serve as back-up, and to enable you to work on projects outside of lab.

☠ Academic dishonesty will not be tolerated. Although it is expected that students will help each other while working on the Projects, what you turn in should reflect your knowledge, competence, and acquired skills. Anyone who turns in someone else's work as his own will receive a zero for the assignment, and may be reported to the Director of University Judiciaries for further action.   Providing materials for another student to copy is also considered academic dishonesty.

Grading: You will complete 4 projects during the quarter, as well as a small individual research project. Projects will be turned-in in digital format (electronically) via Blackboard, and will consist of a final map and write-up. It is a good practice to save all of your graded and returned assignments until you receive your grade for the course. The weighting for the assignments will be as follows:

Project 1: Using GIS to map U.S. Census data (Cartographic emphasis)	10%	40 pts
Project 2: Site selection using GIS (Spatial analysis emphasis)	15%	60 pts
Project 3: Acquiring digital data	20%	80 pts
Project 4: Grid-based site selection using GIS	25%	100 pts
Individual Project (see below)	30%	120 pts

Project due dates will be announced in class. Please note that the time between when a project is assigned and when it is due reflects the time necessary to complete each project. Waiting until the last minute will lead to frustration and a poor final product.

Individual Project: This serves three purposes – to get you to use GIS, to develop your research analytical skills, and to get you to think spatially (i.e., like a geographer). Each student will

develop a small project that focuses on the application of GIS to a research topic; the topic will be of your choosing, developed in consultation with me, but I would highly recommend that it be part of your thesis or dissertation project. It is NOT your thesis, however – it could be a pilot study, or a "proof of concept" study that advances your research interests. It will give you a chance to develop some of your data sources and analysis in a classroom environment and get some of the preliminary writing out of the way. Even if you are doing a project that is more qualitative in nature, you may be able to use GIS to help build your argument. The project should focus on the data collection, methods used, and explaining your analysis of the problem. A handout explaining the format of the project will be made available separately.

Grading scale:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
93-100%	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	≤59

Students having any special needs or disability that might affect their performance in this class are encouraged to speak to me at the start of the quarter to discuss necessary arrangements.

TENTATIVE LECTURE SCHEDULE
Subject to change; Specific project due dates will be announced in class
Readings and Questions/Exercises are not required

Week of:	Lecture Topics & Projects:	Chapters in *Mastering ArcGIS**	Review Questions & Exercises (page #)	Readings in *GTKArcGIS*
Sep 6/8	Course introduction & logistics; *Excel* basics; Introduction to Geographic Information Systems (*ArcMap & ArcCatalog*). Data acquisition for project 1.	1, 2	RQ 4 (34), Ex 2 (51); RQ 1, 3 (75), Ex 1, 2 (93)	1, 2; 3A, 3B, 3C, 4A, 4C
Sep 13/15	Using *ArcGIS: Symbology & Classification, Joining Tables, Querying Data.* Begin Project 1.	4, 5	RQ 1, 7 (164), Ex 1 (177); RQ 1, 6 (202), Ex 2 (213)	5A, 5B, 6A; 9A; 8A, 8B
Sep 20/22	Cartographic Communication; *Labeling Features, Layouts*	3	RQ 2, 4 (120)	7A, 7B, 7C; 19A, 19B, 19C
Sep 27/29	Analyzing spatial relationships; *Selecting features by location, Spatial joins, Geoprocessing (Dissolve, Clip, Buffer, Union);*	6, 7	RQ 1 (236), Ex 1 (248); RQ 5 (263), Ex 6, 7 (279)	10A, 10B; 11A, 11C; 12A
Oct 4/6	Using ModelBuilder; Introduction to GPS. Project 1 due, begin Project 2.	11	RQ 7 (404), Ex 1, 3 (420)	20A, 20B, 20C
Oct 11/13	Projections, datums, and coordinate systems.	---		13A, 13B
Oct 18/20	Georeferencing, Digitizing. Project 2 due, begin Project 3.	---		15A, 15B
Oct 25/27	Raster and Vector GIS; *Symbolizing & classifying raster*. Project 3 due, begin Project 4.	8	RQ 2 (300), Ex 1, 3 (315)	5D, 6B
Nov 1/3	Continued grid-based analysis	---		---
Nov 8/10	In-class work on Individual Projects	---		---

Projects due at Final Exam period: THURSDAY, NOVEMBER 17th @ 12:20

* The optional *Mastering ArcGIS* textbook provides step-by-step tutorials to help reinforce concepts covered in class, and provides review questions and more open-ended exercises for practice. Several of these review/practice questions have been suggested in the syllabus.

Suggested approach for *Mastering ArcGIS*:
- Initially, skim through the Preface of *Mastering ArcGIS*, to learn how the book is organized.
- Before each class, read through the **Mastering the Concepts** section of the assigned readings, to familiarize yourself with material we will be covering. (Much of this may seem "Greek" to you the first time through; plan on reading it through again after we cover the material in class.) Answer any suggested **Chapter Review Questions.**
- After class, work through the **Teaching Tutorial** to reinforce the skills covered in class. Complete any suggested **Exercises**.
- Pay attention to Bolded "Tips" Boxes! These are often very important!

Chapter 1:
- Skip "Modeling feature behavior with topology" (pp. 21-22)
- Skim "About ArcGIS" (pp. 25-32) – we will learn more about these elements throughout the class.

Chapter 2:
- Skip "Displaying rasters" (pp. 70-71) – we will cover this later in the course.

Chapter 7:
- Treat the "optional" sections of the Teaching Tutorial as truly optional – do them if you want. (ModelBuilder is pretty cool!)

Chapter 8:
- Note for Exercises: DEM = "dem2;" "wshd2b" is in Sturgis.mdb geodatabase