GEOGRAPHY (GEG) 340: Geographic Information Science
Fall 2009

Monday and Wednesday 2:30-4:20pm
Nobel Hall Room 105 & GIS Computer Lab (Nobel Hall Room 111)

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Office hours:
Tuesday 1:00-2:00pm
Friday 9:00-10:00am, 11:30am-12:30pm,
and by appointment

Course Objectives

In this course, students will
- learn how computers store and manipulate geospatial data, how to create maps, and how to analyze geospatial data;
- use GIS to solve problems in areas such as city planning, public health, environmental policy, and business;
- gain experience relying on each other and outside resources to solve problems together;
- practice communicating ideas, methods, and results;
- develop an appreciation and enthusiasm for GIS;
- understand how GIS is involved in their lives through issues such as geosurveillance; and
- become critical and informed GIS users who discover, evaluate, and implement a variety of resources to extend their knowledge of GIS and aid on-going problem-solving.

Course Materials

Required course readings will be posted to Moodle. Lab materials will be found on Moodle or on the course network folder (\\xserve.gac.edu\space1\Courses\geography\GEG-340).

An inexpensive ($40, but not required) introductory GIS textbook is:
> Bolstad, Paul. 2008. *GIS Fundamentals: A First Text on Geographic Information Systems*. Third Edition. White Bear Lake, MN: Eider Press.

Course Components

Grading: Final grades are based upon two exams (30%), lab assignments (30%), a course notebook (10%), and a group project (30%). Letter grades will be assigned according to the following scale: 100-93% =A, 92-90% =A-, 89-88% =B+, 87-83% =B, 82-80% =B-, 79-78 =C+, 77-73% =C, 72-70% = C-, 69-60% = D, 59-0% = F. Late assignments will be penalized 10% per week overdue, beginning immediately after the assignment is due.

Exams: Exams allow me to assess how well you understand and carry out the course objectives. The two exams will be based upon lecture, lab, readings, and assignments. Each exam carries the same weight toward your final grade.

Labs: Lab assignments based on ESRI ArcGIS Desktop and IDRISI Andes software will give you opportunities to apply some fundamental techniques for GIS analysis while practicing patience (yes!) and problem-solving. Lab assignments are **due at the beginning of class (2:30 pm) one week after assigne**d unless otherwise indicated.

Course notebook: You are expected to keep a course notebook containing the assigned readings, notes you make while reading or answering study questions, and notes from class, discussion or lab. A three-ring binder will work best to store these papers. This notebook will function as your "textbook" and as a document you can return to for reference after the course is over. I will collect the notebooks randomly throughout the semester and will assess them based on completeness, usefulness, and accuracy.

Collaborative GIS project: GIS is used to solve many problems in areas from business to environment. The collaborative GIS project allows you to develop a problem or ask an interesting question that can be answered using GIS and the knowledge you acquire in this class. The GIS project requires you to think about what interesting problems can be solved using GIS, what data are available, and what additional GIS skills you would like to develop. The project gives you practice in figuring out how to learn skills and solve problems in an environment less structured than lab.

Begin your project right away by identifying people with interests similar to your own. Discuss the possible types of projects you might be able to complete. If you're having trouble getting an idea, talk to me. Then search for data – this is often a time-consuming part of the process. We will discuss your project ideas in class so you can get feedback from me and your classmates. Your group will submit a written proposal (no more than two pages) that identifies your research question and outlines your project (explains how you will answer the question). The proposal must include a list of data sources. This project proposal is due October 21. We will meet to discuss and, if necessary, refine your proposal as you begin to work on the project.

As a group, you will present your results as a poster with maps, diagrams, tables, charts, and/or graphs. You will also give a formal presentation to the class at the end of the semester.

How to Succeed in this Course

- Regularly attend class and lab, complete all assigned readings and labs, and be prepared for and participate in class discussions. Please bring course notebook to class each day.
- Recognize that learning to use geospatial data involves patience, practice, flexibility, and the ability to search out answers from a variety of sources.
- During labs, take the time to reflect on what you are doing. Resist rushing through labs or finishing as quickly as possible.
- Regularly check the course Moodle pages and your email to keep alert of course happenings and any changes.
- Come talk to me to discuss ideas, problems or things you don't understand. I am here to help you learn.
- Take the exams at their scheduled time. Make-up exams are highly discouraged and will not be given unless you notify me at least several days prior to the exam date. The format and content of a make-up exam may differ from the regular exam.
- Uphold academic integrity! This is expected of everyone participating in this course. The Gustavus policy regarding academic honesty is found at http://gustavus.edu/academics/general_catalog/current/acainfo. Cheating or plagiarism will result in no credit for the assignment(s), notification of the Office of the Provost, and possible further action.
- If your first language is not English, the Writing Center has on staff a part-time tutor with professional training in ESL/ELL instruction. Students can schedule work with this tutor by contacting the Writing Center (x7392). Students may bring their instructors documentation concerning their ELL status. Where it is appropriate, faculty may choose to allow such students more time to complete either in- or out-of-class writing assignments. For further information, contact the Academic Advising Office (x7027).
- If you have a specific physical, psychiatric or learning disability and require accommodations, please let me know during the first week of class so that your learning needs may be appropriately met. You will need to provide documentation to the Disability Services Coordinator (Laurie Bickett, x7027) in the Advising Center. All discussions will remain confidential.

SCHEDULE
This schedule—especially the readings—is subject to change as we progress through the semester.

Date	Topic	Readings (due by)	Assignment due
Sept 9	What is GIS?		
Sept 14 & 16	How do we conceive of geospatial information and how do we get a computer to "understand" geospatial data?	Goodchild 1992; Burrough and McDonnell 1998, Ch 2; Couclelis 1992	
Sept 21 & 23	Why are databases so essential to GIS?	Worboys and Duckham 2004, Ch 2	
Sept 28 & 30	What are map projections and datums and why are they necessary?	NOAA Geodesy webpages; Kennedy and Copp 2000, pp 1-21	
Oct 5	What is GPS (aka GNSS)?	Fischetti 2008; Rizos 2002	
Oct 7	*Nobel Conference*		
Oct 12 & 14	What types of geospatial data exist and how do I find them? Why should I care about data standards, quality, and uncertainty?	Chang 2010, Ch 5; Bolstad 2008 Ch 7; King 2008; Burrough and McDonnell 1998, Ch 9; Veregin 1999	
Oct 19 & 21	How do I manipulate data in a GIS to get it from one form to another?	Chang 2010, Ch 6	Project proposal
Oct 26	*Reading Day*		
Oct 28	**Exam I**		
Nov 2 & 4	What should I know about map design and use?	McMaster 2002; Monmonier 1996	
Nov 9 & 11	How and why do we perform some basic spatial analyses?	Goodchild 2002	
Nov 16 &18	How does GIS affect society and vice versa?	Goodchild 2007; Curry 1999	
Nov 23	How can we better share and access data?	Nedovic-Budic and Pinto 2000	
Nov 25	*Thanksgiving Break*		
Nov 30 & Dec 2	Project work		
Dec 7	Field trip		
Dec 9 & 14	Project presentations		Project
Finals Week	**Exam II**		