

## Geography 364 – GIS: Concepts and Applications (Spring '08)

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**Faculty:** Holly Barcus

**Lab Instructor:** Birgit Mühlenhaus

**Lecture:** MWF 2:20 – 3:20

**Lab:** W 3:30-4:30pm; Th 9:00-10:00am – Car 108

**Office:** Carnegie 104c

**Office:** Carnegie 103

**Office Phone:** 651.696.6139

**Office Phone:** 651.696.6906

**Email:** barcus@macalester.edu

**Email:** muehlenhaus@macalester.edu

**Office Hours:** M/W 11-12pm; W 3:30-4:30pm  
or by appointment

**Office Hours:** T 10-11am; W 2-3pm  
or by appointment

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### COURSE DESCRIPTION AND OBJECTIVES

Designed as a sequel to the introductory course in GIS, this course covers the theory and background of GIS and seeks to increase student use of more advanced spatial analysis techniques. There are two broad objectives for this course. First is to extend student knowledge and technical abilities in GIS. We will do this through readings, lectures and demos that address the concepts and principles of GIS analysis and through structured lab exercises that stress technical skill development. The second and parallel objective is to work collaboratively with two other Macalester Geography classes, Urban Field Seminar (Dave Lanegran) and Cities of the 21<sup>st</sup> Century (Dan Trudeau), to produce an Atlas of the Crow River and Elm Creek Watersheds. We will spend the first few weeks of the semester preparing data and analysis strategies and learning a few additional technical tools. Following this initial period we will focus very specifically on completing the project.

Our specific objectives for this semester include:

1. Learning how to manage a large GIS project
  2. Enhancing and increasing GIS technical skills
  3. Producing an Atlas for publication
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### REQUIRED TEXTS

Hayden, Delores. 2004. *Building Suburbia: Green Fields and Urban Growth, 1820-2000*. ISBN 978-0-375-72721-4 (0-375-72721-3)

This can be acquired from: [www.amazon.com](http://www.amazon.com) or

<http://www.randomhouse.com/vintage/catalog/display.pperl?isbn=9780375727214>

**Additional Readings will be provided as needed.**

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### COURSE REQUIREMENTS & GRADING

**Attendance** will be taken during each class period; however there are no points associated with attending as it is your responsibility to attend regularly and keep up with all assignments and exams. We do ask that you **BE ON TIME** to avoid disrupting the class.

Your active participation in this class is key to making it interesting and relevant to your own experiences. I frequently take attendance simply to keep track of who is regularly attending. My experience is that

students who fail to attend regularly also fail to successfully wed the conceptual and theoretical components of GIS with the applied technical requirements.

You are also expected to attend the weekly lab meeting for which you registered. Most of the material covered in lab is not easily made up if you are absent. If you are absent from lab for any reason (excused or unexcused), it is **your** responsibility to obtain the information you missed.

**Field Trip, Movie Night and Undergraduate Research Conference** – This semester we have three out-of-class events which you are required to attend. These count heavily towards your participation grade and are not optional. Please mark your calendars and make arrangements to attend.

**Lab Assignments** – There are 7 lab assignments worth 175 points total. There will be additional assignments related to the group or individual projects.

**Local News Articles** – In order to ground ourselves in the current issues relevant to our study area you will gather two relatively recent news articles and be prepared to discuss them in class. This discussion will accompany our overview of the study area.

**Other Assignments** – As an interactive, project-based course there will be several additional assignments over the course of the semester that pertains specifically to our project. You will have sufficient notice and description of these assignments.

**Applied Group Project** – This semester we are working collaboratively with two other Macalester Geography classes, Urban Field Seminar (Dave Lanegran) and Cities of the 21<sup>st</sup> Century (Dan Trudeau), to produce an Atlas of the Crow River and Elm Creek Watersheds.

**Incompletes** – Incompletes will be given according to Macalester policy. That means it will be given only to students “who have encountered difficulties beyond their control that have hindered their academic progress.”

**Journals** – For this course you are required to keep a journal of your thoughts and reflections over the semester. The purpose of the journal is for you to spend time reflecting on your experiences in the class in general and our community project specifically. Journals are due each week and you are required to complete at least one new entry per week but can certainly complete more if you want to. You will earn 5 points per entry. I do not grade the content of the journal. It is my hope that you will honestly consider the progress of the applied group project and your individual project, and the class as well, and use the journal as a tool for exploring the challenges and rewards of group projects and collaborative partnerships.

Discussion leaders: There are three topic areas for which we will discuss based on current literature. These include *Issues in GIS*, *Public Participation GIS*, and *Suburbia*.

**Make-up and Late Assignments** – Late assignments will be accepted for partial credit only.

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## CLASSROOM POLICIES

**Courtesy** – The first and most important classroom policy is to BE COURTEOUS! This includes:

- If you arrive late or need to leave early, do so with a minimum of disruption.
- Please turn-off all beepers, pagers, cell phones, etc. during class.
- Be polite when others are speaking, there is enough time to discuss all perspectives.

**Computers** – Everyone will be assigned a particular computer where you will save all your projects. You will also be expected to make use of the lab outside of regular class time to work on your assignments and projects. To make sure you have access to your computer outside class time, you will be given the name and email address of the other student(s) assigned to your same computer in other classes. It will be your responsibility to coordinate your schedules.

**Course Information** – A fair amount of course information will be disseminated via email. Please be sure to check your Macalester email account regularly.

**Lab Hours** – Lab time will be used to demonstrate cartographic and GIS applications using ESRI's ArcView 9.2 software. TAs will be in the lab during certain hours to help you. The lab schedule will be posted on the GIS webpage <http://www.macalester.edu/geography/gis/> and on the door of the lab. Please note that the lab is a "teaching lab" and not a general computer lab – i.e. it is not the place to check email, write papers, etc. GIS assignments take priority during open lab times. **As a member of the Advanced GIS class, you will be given additional lab privileges, including extended hours and access to the lab. Please do not abuse these privileges.**

**Lab Rules** – There are specific policies about lab conduct posted.

1. Do not to bring FOOD or BEVERAGES into the lab; beverages in containers must be kept closed while in the lab
2. Work on your designated computer and save all files to your personal workspace
3. Preserve original data files (i.e. you will copy any GIS data into your personal workspace)
4. Print only maps on the color printer
5. Obtain permission before downloading files and/or programs to the computer and before using any special contract data
6. Turn off your cell phone *at all times* while working in the lab

**Office Hours** – Office hours provide a great opportunity to discuss questions, issues, or concerns about the class or to just talk about GIS. Feel free to stop by during office hours or schedule a different time to meet, if your schedule conflicts with the posted office hours.

**Participation** - This is an interactive class. Some days will be mostly lecture while others will be in-class exercises and discussions. Be prepared to participate.

**Academic Integrity** – Cheating and plagiarism are unacceptable and dishonest. In this class I expect you to complete and turn in your own work and to follow established academic practices regarding proper use and citation of materials and ideas that are not your own. Engaging in cheating or plagiarism will result in a failing grade in this class. If you have questions about what constitutes plagiarism or cheating, please see me.

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### **1000 point grading scale**

- 100 = Participation
- 25 = Journals (5pts per entry; 5 entries)
- 400 = Applied Project (Atlas)
- 100 = Project Presentation at Undergraduate Conference
- 175 = Labs Assignments (7; 25 pts each)
- 100 = Reflection paper
- 50 = Discussion leader
- 50 = News articles

A = 93%+ A- = 90.0 – 92.9%  
 B+ = 87.0% - 89.9%; B = 83.0 – 86.9%; B- = 80.0 - 82.9%  
 C+ = 77.0% - 79.9%; C = 73.0 – 76.9%; C- = 70.0 – 72.9%  
 D+ = 66.0% - 69.9%; D = 63.0 – 66.9%; D- = 60.0 – 62.9%

**General Schedule: Dates are approximate – we will adjust as needed.**

SECTION	DATE	LECTURE TOPIC	READINGS	LAB
<b>1 (Base Maps and General Exploration of Project)</b>	Jan 28	Introduction to project: Goals, Objectives, Partners Assignment: News articles	Assign: Delores Hayden book; Assign news articles	Data Sources: A Discussion of our current databases in the lab (Birgit)
	Jan 30	Overview of study area: watersheds, etc. News article discussion; Volunteer to lead future discussions	MPCA: River Basin and local news articles; Bjelland 2006	
	Feb 1	Discussion: Laying out the project, data, and methods AND brainstorm base maps		
<b>Saturday, Feb 2 Ground Hog Day Tour of the watershed 9:00- 3:30 (Make-up day Feb 9)</b>				
<b>1</b>	Feb 4	<b>Lab 1: Relational Databases - Using Microsoft Access and Geodatabases</b>		
	Feb 6	Discussion: Dividing the workload for basemaps		
	<b>Thursday, Feb 7, 6:30pm</b> (Carnegie 107) Movie night. We will watch a movie on suburbanization with the Advanced GIS and Cities of the 21 <sup>st</sup> Century Classes. Popcorn will be served.			
	Feb 8	Discussion: Delores Hayden book and movie	<b>Journal Due</b>	
<b>1</b>	Feb 11	First draft basemaps due: Discussion and commentary		
	Feb 13	Continue revising and editing basemaps		
	Feb 15	<b>Lab 2: Advanced cartography with ArcMap (Birgit)</b>		
<b>1</b>	Feb 18	Discussion: Public Participation GIS and GIS partnerships	Elwood & Ghose, 2001; Elwood & Leitner 2003, Mitchell Ch8	
	Feb 20	<b>Lab 4: Raster data and social services</b>		

	Feb 22	FINAL BASE MAPS DUE	<b>Journal Due</b>	
<b>2 (Support Maps: Students partner with other classes to support mapping work)</b>	Feb 25	Discussion: Next step – Coordinating with other classes – divide work (*We will receive prelim proposals from other classes and divide work)		
	Feb 27	<b>Lab 3: Geoprocessing &amp; Model-Builder</b>		
	Feb 29	Draft Intro text due Cont'd data gathering		
<b>2</b>	Mar 3	Continue Mapping		
	Mar 5	<b>Lab 4: Spatial Data Analysis</b>	Mantaay and Ziegler Ch 9: Methods of Spatial Data Analysis	
	Mar 7	Discussion: Update and progress report FINAL Intro text due	<b>Journal Due</b>	
<b>2</b>	Mar 10	Mapping		
	Mar 12	<b>Lab 5: TBA</b>		
	Mar 14	Mapping		
<b>2</b>	<b>Mar 17-21</b>	<b>SPRING BREAK: NO CLASS</b>		
<b>2</b>	Mar 24	Discussion: Issues in GIS	Maantay & Zeigler Ch 11: Ethical Issues in GIS and Urban Planning; G&T: Sui & Morril, 2004; Dobson 2004	
	Mar 26	Mapping		
	Mar 28	Map Critique: All maps due at beginning of class		
<b>3 (Final Design)</b>	Mar 31	Coordinate with small groups to develop final maps, written text, layout		
	Apr 2	Coordinate with small groups to develop final maps, written text, layout	<b>Journal Due</b>	
	Apr 4	Discussion: Oral Progress Reports		
<b>3</b>	Apr 7	Work time		
	Apr 9	Final preliminary draft		

		of text, maps and layouts due.		
		Final title and photos due.		
	Apr 11	<b>LAB 6: TBA</b>		
<b>3 (AAG)</b>	Apr 14	Meet with Birgit for final design critique		
	Apr 16	Meet with Birgit for final design critique		
	Apr 18	Work time		
<b>3</b>	Apr 21	FINAL maps due		
	Apr 23	Presentation Prep		
	Apr 25	Presentation Prep		
<b>UNDERGRADUATE RESEARCH CONFERENCE PRESENTATIONS</b>				
<b>3</b>	Apr 30	Final Revisions		
	May 2	Final Revisions		
	May 5	Final Revisions		
<b>3</b>	May 8	Congratulations!	<b>Reflection Paper Due</b>	

## Reading List

### Required Readings:

#### GIS Topics

Elwood, S. and H. Leitner. 2003. GIS and Spatial Knowledge Production for Neighborhood Revitalization: Negotiating State Priorities and Neighborhood Visions. *Journal of Urban Affairs* 25:139-157.

Elwood, S. and R. Ghose 2001. PPGIS in Community Development Planning: Framing the Organizational Context. *Cartographica* 38:19-33.

Longley, Paul A., Michael F. Goodchild, David J. Maguire, David W. Rhind. 2005. *Geographic Information Systems and Science, Second edition*. John Wiley and Sons: NJ.

Maantay, Juliana, and John Ziegler. 2006. *GIS for the urban environment*. ESRI Press: Redlands, CA.

Sui, D. and R. Morrill, 2004. Computers and Geography: From Automated Geography to Digital Earth. In *Geography and Technology*. Eds. S. Brunn, S. Cutter, J.W. Harrington, Jr. Kluwer, Boston. Pgs81-108.

Dobson, J. 2004 The Gis Revolution in Science and Society.. In *Geography and Technology*. Eds. S. Brunn, S. Cutter, J.W. Harrington, Jr. Kluwer, Boston. Pgs573-588.

### **Project-Specific Readings**

Hayden, Delores. 2004. *Building Suburbia: Green Fields and Urban Growth, 1820-2000*.

Bjelland, M. D., M. Maley, L. Cowger, L. Barajas. 2006. The quest for authentic place: The production of suburban alternatives in Minnesota's St. Croix Valley. *Urban Geography* 27(3): 253-270.

Minnesota Pollution Control Agency. 2000. Upper Mississippi River: Basin Information Document 2000. MPCA  
Northern District, Brainerd Office.

Mitchell, Bruce. 1997. Partnerships and Participation. In *Resource and Environmental Management*. Longman: Waterloo, Ontario, p155-175.

### **Additional readings for your enjoyment:**

Kwaku Kyem, P.A. 2001. Power, Participation, and Inflexible Institutions: An Examination of the Challenges to Community Empowerment in Participatory GIS Applications. *Cartographica* 38:5-17.

Schuurman, Nadine and Mei-Po Kwan. 2004. Guest editorial: Taking a walk on the social side of GIS. *Cartographica* 39:1:1-3.

Warren, Stacy. 2004. The utopian potential of GIS. *Cartographica* 39(1): 5-16.

### **Resources for Watershed Data**

<http://www.dnr.state.mn.us/rprp/watersheds.html>  
DNR website for watersheds in Minnesota

<http://www.pca.state.mn.us/water/basins/index.html>  
Minnesota Pollution Control Agency website

[http://www.riversmn.org/resources\\_links.html](http://www.riversmn.org/resources_links.html)  
Rivers Council of Minnesota

### **Elm Creek Watershed:**

<http://www.cfboard.state.mn.us/eis/aqdetail/aq2009.html>  
Elm Creek Watershed Management Commission Members

<http://www.elmcreekwatershed.org/>  
Elm Creek Watershed

<http://www.elmcreekwatershed.org/mgmtplan.shtml>  
Elm Creek Watershed Management Plan

**Cities in the Elm Creek Watershed:**

Champlin, Corcoran, Dayton, Maple Grove, Medina, Plymouth, Rogers

**Counties within the Elm Creek Watershed:** Hennepin

**Crow River Watershed:**

<http://www.crowriver.org/>

**Crow Joint Powers: Crow River Organization of Water**

**Counties within the North and South Fork Crow River watersheds:** Carver, Hennepin, Kandiyohi, McLeod, Meeker, Pope, Renville, Sibley, Stearns, Wright