

Geography 225 - Introduction to Geographic Information Systems (SPRING 2020)

Faculty: Holly Barcus

Lab Instructor: Ashley Nepp

Lecture: Carnegie 107

Lab: Carnegie 108

MWF 9:40am-10:40am

Wed 10:50am-12:20pm

Thurs 9:40am- 11:10am

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Thurs 1pm-2pm; *or by appointment*

Office Hours: Wed 2:30-4:30pm; Thurs 3:00-5:30pm;
or by appointment - just send me an email!

Course Description and Objectives

The ability to create, visualize, and analyze spatial data is an increasingly important skill for assessing and understanding our rapidly changing global, regional, and local communities. Maps are the primary medium through which we communicate our knowledge of the spatial world, but are, by design, generalizations of more complex spatial data. In the first part of this course we will explore the principles of map production and geographic concepts that provide a foundation for spatial data analysis. During the second half of the course we will shift our focus to Geographic Information Systems and the development, display, and analysis of spatial data in a digital environment. We will approach each topic conceptually through our lecture sessions and then apply these principles during lab sessions. By the end of this course you should:

- Understand maps and their projections, scale, resolution and accuracy
- Be a more critical map user
- Acquire a basic GIS vocabulary
- Become familiar with the most used features of ArcGIS software
- Learn to solve common geographic problems using a GIS
- Be able to carry-out a GIS project from problem conceptualization to final analyses and interpretation

COURSE READINGS

Required Texts

- Monmonier, Mark. 1991. *How to Lie with Maps*. Chicago: University of Chicago Press

Additional Reading

- *See attached reading list*

COURSE RESOURCES, REQUIREMENTS & GRADING

Resources: For each class meeting, the lecture slides and assignments will be made available on Moodle immediately following our lecture time. Other resources such as additional readings, web and news links can be found here as well. Please use this site as a resource for studying and exploring varied and interesting dimensions of GIS.

Attendance – Attendance is expected for each lecture and lab period. Please attend regularly and keep up with all assignments and exams – your input and participation are key to making it interesting and relevant to your own experiences. Please **BE ON TIME** and **TURN OFF YOUR CELL PHONE** to avoid disrupting the class.

I frequently take attendance simply to keep track of who is regularly attending. My experience is that students who attend regularly are better equipped to successfully wed the conceptual and theoretical components of GIS with the applied technical requirements.

The lab section of this course also meets regularly. Most of the material covered in lab is not easily made up if you are absent. If you are absent from lecture or lab for any reason, please realize that it is your responsibility to obtain the information you missed.

Lecture Exercises and Final Project – Over the course of the semester we will venture into the lab during lecture periods for more applied exercises in which you will utilize the concepts that we are discussing in lecture. Lecture exercises are designed to allow you to experiment with different techniques that we have discussed in lecture. We will discuss each exercise during the class period in which it is due.

Towards the end of the semester, you will complete a final project. In brief, the project consists of four major components: a project proposal, a final paper, an oral presentation, and a digital poster. Details will be forthcoming.

Exams will consist of short answer, essay, and applied problem-solving questions. There are three exams; each exam is 100 points and will cover lecture and lab material. The final exam is comprehensive.

PLEASE TAKE NOTE OF YOUR FINAL EXAM TIME. BECAUSE IT IS A PRACTICAL EXAM IN THE GIS LAB THESE ARE THE ONLY TIMES YOU MAY TAKE THE EXAM. PLEASE PLAN YOUR TRAVEL DATES ACCORDINGLY

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.”

Make-up and Late Assignments

- **Exams** – Students are expected to take exams at the scheduled time. If extreme circumstances make it impossible to take an exam at the scheduled time, please notify me as far in advance as possible or as soon as possible after an unanticipated emergency.
- **Lecture assignments** – Late assignments will be accepted for partial credit only.
- **Lab assignments** – Late assignments are only accepted in exceptional cases, such as illness or family emergency. In such cases, please contact Ashley *prior* to the due date. For unexcused absences, late assignments will be deducted one letter grade from your earned score for each day it is late.

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 cell phones, I-pods, 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 in the lab 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. It is your responsibility to coordinate your schedules.

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

Lab Hours – Lab time will be used to demonstrate cartographic and GIS applications using ESRI's ArcGIS 10.4 software as well as allow you time to begin your weekly assignment. Should you need to work outside of class time, Lab Assistants will be in the lab during certain hours to help you. The lab schedule will be posted on the Intro GIS Moodle page and on the door of the lab. Please do not leave your lab work until the last minute – the lab may not be available and systems do crash from time to time. Also, 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.

Lab Rules – While working in the computer lab, please

1. do not to bring FOOD or BEVERAGES into the lab; beverages in containers must be kept closed while in the lab
2. work only on the C: drive; save frequently, and backup your work to the H: drive or other cloud storage so it is always accessible to you when you need it
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 (no written assignments or lecture exercises – these can be printed in the library)
5. obtain permission from Ashley before downloading files and/or programs to the computer and before using any special contract data
6. silence 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 course. Some days will be mostly lecture while others will be in-class exercises and discussions. In both the lecture and lab sections of this course we define participation as attending class regularly and on-time, asking questions, contributing to discussions, being prepared (this means doing the readings and exercises before coming to class) and generally being intellectually engaged in the material.

3 Question Rule: Asking questions following in-class presentations or guest lectures is an acquired skill. Such skills only improve with practice. The 3 Question Rule requires that 3 questions be asked following every presentation that occurs in this classroom. As a general rule, we will not move on to the next presentation until at least three questions have been asked of the presenter(s). Questions can come in a variety of forms, for example, asking for clarification, or more information. Think critically, ask questions.

Academic Integrity – Cheating and plagiarism are unacceptable and dishonest. In this class you are expected 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. More information is available about Macalester's academic integrity policy in the Student Handbook (www.macalester.edu/academicprograms/academicpolicies/academicintegrity/).

Health and Well-Being

Here at Macalester, you are encouraged to make your well-being a priority throughout this semester and your career here. Investing time into taking care of yourself will help you engage more fully in your academic experience. Remember that beyond being a student, you are a human being carrying your own experiences, thoughts, emotions, and identities with you. It is important to acknowledge

any stressors you may be facing, which can be mental, emotional, physical, financial, etc., and how they can have an academic impact. I encourage you to remember that sleeping, moving your body, and connecting with others can be strategies to help you be resilient at Macalester. If you are having difficulties maintaining your well-being, please reach out to one of the resources listed below.

Supporting Student Learning

In some circumstances, course design may pose barriers to a student's ability to access or demonstrate mastery of course content. If you are encountering barriers to your learning that we can mitigate, please bring them to our attention. Reasonable accommodations are available for students with documented disabilities. Contact the Disability Services office by emailing disabilityservices@macalester.edu, or calling 651-696-6874 to schedule an appointment to discuss your individual needs. It is important to meet as early in the semester as possible; this will ensure that your accommodations can be implemented early on.

835 point grading scale

310 = Exams (3; 100 pts each)

165 = Final project

250 = Lab Assignments

60 = Lecture exercises (6; 10 pts each)

50 = Participation and attendance

A = 94+	A- = 90.0 – 93.9%	
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+ = 67.0% - 69.9%;	D = 63.0 – 66.9%;	D- = 60.0 – 62.9%

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

NOTE: All Readings denoted with ** are reference readings and therefore OPTIONAL

THEME	DATE	LECTURE TOPIC	READINGS	LECTURE ASSIGNMENT DUE DATES	LAB ASSIGNMENT
1		No Class			NO LAB THIS WEEK
		No Class			
	Jan 24	Course Overview and Lab Intro			
2	Jan 27	What is GIS? Types of GIS Problems	Monmonier Ch 1 Cohen 2011; Scheid Vineyards 2013 **Delaney & Van Niel Ch 1		LAB 1: ArcGIS Quick-Start Guide LAB DUE: Tues Feb 2 – Fri Feb 7
	Jan 29	Data Visualization (Ashley)	Few 2009 Krygier & Wood Ch 9		
	Jan 31	Map Types I	Monmonier Ch 5-6		
3	Feb 3	Map Types II	Monmonier Ch 7-8		LAB 2: Data Symbolization & Layout LAB DUE: Tues Feb 11 – Fri Feb 14
	Feb 5	Map Types III The Easiest Way to Lie with Maps: Data Classification <i>Assign Lect. Ex. 1: Data Classification</i>	Monmonier Ch10		
	Feb 7	Map Design I: Labeling, Typography & Placement (Ashley) <i>*Please bring a map to class</i>	Brewer Ch 6		
4	Feb 10	Map Design II: Map Elements & Composition (Ashley) <i>*Please bring a map to class</i>	Brewer Ch 1; Buckley 2012; Buckley & Field 2011	Lecture Exercise 1 due in class	LAB 3: Spain Map: Map Design & Labeling DRAFT MAP DUE: Have your draft printed and ready for peer review before you come to lab next week
	Feb 12	Coordinate Systems & Projections <i>Assign Lect. Ex. 2: Exploring scale and projections</i>	Tyner Ch 6 **Delaney & Van Niel 2008, Ch 5		
	Feb 14	Coordinate Systems & Projections, cont.		Lecture Exercise 2 due in class	
5	Feb 17	In class <i>Lect. Ex. 3: Designing for Map Purpose (US Poverty map)</i>			LAB 3: Spain Map: Map Design & Labeling FINAL MAP DUE: Tues Feb 25 – Fri Feb 29
	Feb 19	Poverty map presentations, Catch up & Review Session		Post Final Poverty Maps (Lect. Ex. 3) to Moodle before class	
	Feb 21	EXAM 1			
6	Feb 24	GIS: Spatial Problem Solving	Smith 2007; Murphy 2008		LAB 4: Importing Data:

		<i>Assign Lect. Ex. 4: GIS Data Source Presentations</i>			Geocoding, Attribute Joins & Census Data <i>Please read Brewer Chapter 3 before lab</i> LAB DUE: Tues Mar 3 – Fri Mar 6
	Feb 26	Representing Data in GIS: The Vector & Raster Models IN CLASS: QUIZ (Based on recorded lecture) Vector / Raster Exercise	BEFORE CLASS : LISTEN TO RECORDED PPT LECTURE « VECTOR – RASTER » Hale 2008 **Delaney & Van Niel 2008 Ch 2		
	Feb 28	CENSUS DATA QUIZ (Based on PPT) <i>Lect. Ex. 5: Using ACS data - in class</i> <i>Discuss Lecture exercise 6 in class</i>	Watters 2016; Nicholson 2012		
7	Mar 2	Alternative Data Representations: Discussion	Layton et al. 2008; **Delaney & Van Niel 2008, Ch 9		LAB 5: Vector Data Analysis: Site Suitability LAB DUE: Tues Mar 8 – Fri Mar 13
	Mar 4	Geoprocessing Techniques <i>Assign Lect. Ex. 6: Overlay Analysis</i>	BEFORE CLASS: REVIEW CENSUS PPT READ: Wombold 2008	Lecture Exercise 5 due in class	
	Mar 6	Work day for data presentation groups			
8	Mar 9	Lecture Ex 4 Due: Data Presentations ***Upload PPT to Moodle before class			LAB 6: Working with Raster Data LAB DUE: Tues Mar 24 – Fri Mar 27
	Mar 11	GPS 1 – Lecture	Harringa 2007; Hill 2008		
	Mar 13	GPS 2 – Data Collection <i>*Dress for the weather – we will be outside</i>		Lecture Exercise 6 due in class	
	Mar 14-22	SPRING BREAK – NO CLASS			NO LAB THIS WEEK
9	Mar 23	Final Project Strategies and Planning: A Discussion			LAB 7: Data Creation: GPS & Digitizing LAB DUE: Tues Mar 31 – Fri Apr 3
	Mar 25	Guest Lecture TBA			
	Mar 27	Project + Data Organization (Ashley)		Final Project Proposals are due in class (paper hardcopy)	
10	Mar 30	Project Work			LAB 8: Final Map Design <i>Have topic ideas and data by start of lab this week</i> FINAL MAP DUE: In Lab April 15th or 6th
	Apr 1	Project Work			
	Apr 3	EXAM 2			
11	Apr 6	Project Work		Final Project Data Check in Class	LAB 8: Final Map Design

(AAG DENVER)	Apr 8	Project Work			DRAFT MAP DUE: Have your draft printed and ready for peer review before you come to lab this week
	Apr 10	Project Work			
12	Apr 13	Project Work			Final Lab Period Final Map Designs & Data Back-up Additional GIS Resources Advanced Courses
	Apr 15	Project Work			
	Apr 17	Project Work			
13	Apr 20	Project Work		All Printed Papers and Maps due in class	NO LAB THIS WEEK
	Apr 22	Project Work		Optional Draft Posters Due to Moodle Dropbox Wednesday @ midnight	
	Apr 24	Final Project Presentations			
14	Apr 27	Final Project Presentations			NO LAB THIS WEEK
	Apr 29	Final Project Presentations		Upload Final Project Posters to Moodle by @ midnight	
	May 1	Course Evaluation & Review Poster Competition with prizes			
15	May 4	FINAL EXAM Part 1 (IN CARN 107)			NO LAB THIS WEEK
FINAL EXAM	SAT MAY 9	FINAL EXAM Part 2 (IN GIS LAB)	Note: 8am-10am on SATURDAY!		