Geography 225 - Introduction to Geographic Information Systems (FALL 2021)

Faculty: Holly Barcus

Lecture: Carnegie 107
MWF 9:40am-10:40am

Office: Carnegie 104C
Office Phone: 651.696.6139

Email: barcus@macalester.edu

Office Hours: M/W 1:00am-3:00pm;
or by appointment

https://tinyurl.com/OfficeHoursHolly

Lab Instructor: Ashley Nepp

Lab: Carnegie 108
Wed 10:50am-12:20pm
Thurs 9:40pm- 11:10pm

Office: Carnegie 110
Office Phone: 651.696.6906

Email: anepp@macalester.edu

Office Hours: M 10:50-11:50pm; Tu 3:10-4:30pm;
or by appointment - just send me an email!

https://tinyurl.com/OfficeHoursNepp

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. 2018. *How to Lie with Maps. 3rd edition.* 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.

Lecture Exercises and Final Project – Over the course of the semester we will have a series of applied exercises. These exercises will help you utilize the concepts that we are discussing in class a more hands-on manner. Exercises are designed to allow you to experiment with different techniques and will be discussed 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, GIS analysis, a story map, and an oral presentation. 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.

<u>**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**</u>

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.

Feeling Ill? Need to miss class?
- Ashley and I are here to help you learn. If you're not feeling well, please send us an email and we will work with you to figure out how to keep up with the class. It is very important that we all stay healthy and we trust that if you're not feeling well, it's best to rest and communicate with us as soon as possible.

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, 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 Pro 2.8 software as well as allow you time to begin your weekly assignment. 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 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.

Attendance – Attendance is expected for each tutorial 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 and in building knowledge and community. Please *be on time* and please follow "Netiquette" principles, when applicable.

As instructors, we usually take attendance simply to keep track of who is regularly attending. Our 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.

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 us or to the many resources available to you at Macalester.

Please adhere to the [Mac Stays Safer Community Commitment](), which outlines practices to maintain your own health and that of others around you: wear a mask, maintain a 6 foot distance from others, wash your hands frequently, use hand sanitizer when handwashing is not available.

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.

THEME	DATE	LECTURE TOPIC	READINGS	LECTURE ASSIGNMENT DUE DATES	LAB ASSIGNMENT
1		**No Class**			**LAB 1: ArcGIS Quick-Start Guide** LAB DUE: Mon Sept 6 – Thurs Sept 9
	Sept 1	Course Overview and Lab Intro			
	Sept 3	What is GIS? Types of GIS Problems	Cohen 2011; Scheid Vineyards 2013		
2	Sept 6 (Labour Day)	No Class	No Class		**LAB 2: Data Symbolization & Layout** *Please read __Brewer Chapter 3__ before lab* LAB DUE: Mon Sept 13 – Thurs Sept 16
	Sept 8	Data Visualization (Ashley)	Few 2009 Krygier & Wood Ch 9		
	Sept 10	Map Types I	Monmonier Ch 6-7 (Ch 10 for Topo maps, optional)		
3	Sept 13	Map Types II	Monmonier Ch 8-9		**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 *Draft map will be assigned a grade based on completeness: A for a full, complete draft; D for just started, etc.*
	Sept 15	Map Types III The Easiest Way to Lie with Maps: Data Classification *Assign Lect. Ex. 1: Data Classification*	Monmonier Ch11		
	Sept 17	Map Design I: Map Elements & Composition (Ashley) **Please bring a map to class*	Brewer Ch 1; Buckley 2012; Buckley & Field 2011	Lecture Exercise 1 due in class or on Moodle*	
4	Sept 20	Map Design II: Labeling, Typography & Placement (Ashley) **Please bring a map to class*	Brewer Ch 6		**Spain Map: Revision** FINAL MAP DUE: Mon Sept 27 – Thurs Sept 30
	Sept 22	Coordinate Systems & Projections *Assign Lect. Ex. 2: Exploring scale and projections*	Monmonier Ch2, pages 5-19 Tyner Ch 6		
	Sept 24	In class *Lect. Ex. 3: Designing for Map Purpose (US Poverty map)*		Lecture Exercise 2 due to Moodle upload SATURDAY @ midnight	
5	Sept 27	Poverty map presentations, Catch up & Review Session		Post Final Poverty Maps (Lect. Ex. 3) to Moodle **before** class	**LAB 4: Importing Data: Geocoding, Attribute Joins & Census Data** *Please review __Brewer Chapter 3__ before lab*
	Sept 29	**EXAM 1**			

Week	Date	Topic / Assignment	Readings	Due	Lab
	Oct 1	GIS: Spatial Problem Solving *Assign Lect. Ex. 4: GIS Data Source Presentations*	Smith 2007; Murphy 2008		LAB DUE: Mon Oct 4 – Thurs Oct 7

6	Oct 4	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 »		**LAB 5: Site Suitability Analysis (Geoprocessing)**
					
					LAB DUE:
					Mon Oct 11 – Thurs Oct 14

	Oct 6	Alternative Data Representations: Discussion	Watters 2016; Nicholson 2012		
	Oct 8	Geoprocessing Techniques *Assign Lect. Ex. 5: Overlay Analysis*	Urban Planning & GIS Opioids and GIS (See links in Moodle)		

7
(NACIS
Ashley
away
Tu-Fri)
	Oct 11	CENSUS DATA
		    QUIZ (Based on PPT)
		    Lect. Ex. 6: Using ACS data - in class
		Discuss Lecture exercise 6 in class
			BEFORE CLASS:
			REVIEW CENSUS PPT
			
			READ: Wombold 2008
					LAB 6: Working with Raster Data
					
					LAB DUE:
					Mon Oct 18 – Wed Oct 20

	Oct 13	Work day for data presentation groups		Lecture Exercise 5 due @ midnight	
	Oct 15	Lecture Ex 4 Due: Data Presentations ***Upload PPT to Moodle before class		Lecture Exercise 6 due @ midnight	
8	Oct 18	GPS 1 – Lecture	Harringa 2007; Hill 2008		We will meet during your lab period: **Remember Thursday lab will meet on Tuesday**; Wednesday lab will meet as usual.
	Oct 20	GPS 2 – Data Collection *Dress for the weather – we will be outside*			
	Oct 22	**FALL BREAK – NO CLASS**			
9	Oct 25	Final Project Strategies and Planning: A Discussion			**LAB 7: Data Creation: GPS & Digitizing** LAB DUE: Mon Nov 1 – Thurs Nov 4
	Oct 27	TBD - Project Work			
	Oct 29	Project + Data Organization (Ashley)		Final Project Proposals are due TODAY to Moodle DROPBOX	
10	Nov 1	Project Work			**LAB 8: Maps, Infographics + Storytelling** *Have topic ideas and data by start of lab this week*
	Nov 3	Project Work			

	Nov 5	**EXAM 2**			FINAL MAP DUE: By your lab period next week
11	Nov 8	Project Work		Final Project Data Check in Class	**Final Lab Period** Final Map Designs & Data Back-up Additional GIS Resources Advanced Courses
	Nov 10	Project Work			
	Nov 12	Project Work			
12	Nov 15	Project Work			NO LAB THIS WEEK
	Nov 17	Project Work		All Final Project Papers & Maps are due to Moodle FRIDAY @ 5pm	
	Nov 19	Project Work		Optional Draft Posters Due to Moodle Dropbox SUNDAY @ midnight	
13	Nov 22	Project Work			NO LAB THIS WEEK
	Nov 24	**THANKSGIVING BREAK!!**			
	Nov 26	**THANKSGIVING BREAK!!**			
14	Nov 29	Final Project Presentations			NO LAB THIS WEEK
	Dec 1	Final Project Presentations			
	Dec 3	Final Project Presentations		Upload Final Project Posters to Moodle by SUNDAY @ midnight	
15 (IGU EC Meeting, Holly likely away)	Dec 6	Course Evaluation & Review Poster Competition with prizes ☺			NO LAB THIS WEEK
	Dec 8	FINAL EXAM Part 1 (IN CARN 107)			
FINAL EXAM	**TUES DEC 14**	**FINAL EXAM Part 2 (IN GIS LAB)**	**Tues. 12/14**	**8:00am – 10:00am**	