Applied GIS (GEOL235) Fall 2016

Instructor:		Amanda Schmidt
Office/contact:		CARN 406/x58342
Email address:		aschmidt@oberlin.edu
Class meeting times:		Monday 7-9:50 pm CARN 213
		Thursday 1:30-4:20 pm CARN 213
TAs:	Joe Martin	jmartin@oberlin.edu
	Emma Patterson	epatters@oberlin.edu
	Caroline Lawlor	clawlor@oberlin.edu
Office hours:	Amanda (CARN 406)	Tuesday 1:30-3:00 pm
		Fri 10-11:30 am
		(or by appointment)
	Joe (CARN 213)	Monday 4-5 pm
		Wednesday 4-5 pm
	Emma (CARN 213)	Saturday 4-6 pm or by appt.
	Caroline (CARN 213)	Sunday 4-6 pm or by appt.

If you need to come see me but cannot come during regular office hours, you may make an appointment for a more convenient time. You also can see any of the TAs for the class (Joe Martin, Emma Patterson, or Caroline Lawlor). If you do not understand some of the course material, please ask questions before it is too late! To encourage you to come see me, there are 2 extra credit points available if you come to see me during the first two weeks of the semester.

What is GIS?

At the most basic level, geographic information systems are about spatial display and analysis of data. In this course we will focus on learning to use one GIS software program but many of the skills you learn will be transferable to other software as well. Obviously that isn't necessarily related to geology, but we will focus on displaying and analyzing geologic data in class this semester. By the end of the course, I expect that you will be comfortable with how to ask, set up, and solve geospatial problems using GIS; you will be able to find data and prepare it for use; and you will be able to troubleshoot problems that arise when you are using GIS. In short, you will be able to use GIS as a tool to solve geologic problems with a spatial component and will be able to display the information.

My teaching philosophy

GEOL235 is designed to be a partnership between me, the professor, and you, the students. My aim for the class is to minimize the time I stand in front of you and lecture and, instead, to maximize the time that you are applying GIS topics to activities. This way you learn the material more deeply as you are not only practicing the intellectual knowledge, but you are able to apply it to a variety of situations. I will give you a chance for a mid-term evaluation of my teaching, but if you have suggestions prior to or after that, please let me know.

Learning goals

By the end of the semester, in addition to learning material related to specific topics we cover in class, you will be able to:

1. Solve problems using GIS. Doing this involves:
   a. Develop appropriate questions that require spatial analysis and can be solved with GIS.
   b. For a given spatial problem, design an appropriate conceptual approach to solve the problem.
   c. For a given problem, determine the appropriate data required and its availability.
   d. For a given problem using pre-existing data sets, locate, evaluate, troubleshoot, and prepare appropriate existing data sets.
   e. For a given problem, use data to complete the conceptually modeled analysis in ArcGIS and correctly and accurately document the output data sets.
2. Communicate the results of analyses effectively. This includes being able to:
   a. Create cartographically complete maps that accurately and effectively convey appropriate and correct information to the target audience.
   b. Communicate the results of data collection, preparation, and analysis in consulting style reports, posters, and appropriate maps for the target audience.
3. Apply techniques learned in class to consulting-style problems in a team environment
4. Troubleshoot issues that arise in all stages of spatial problem solving by working with peers, using help files, and using online forums in a productive and appropriate manner

How to succeed in Applied GIS

All class meetings require active involvement. To participate, you must prepare before each class.

This class is computer intensive and will require a large amount of time outside of class. **During past iterations of this course students spent an average of 6-10 hrs/week OUTSIDE of class time completing assignments for the class.** Many Monday classes will have a reading assignment that you need to complete. In addition, most classes will require that you have downloaded and prepared data or otherwise completed assignments started during the previous class. Each week you will have multiple assignments due. It is your responsibility to keep up with the work and to keep track of when assignments are due. Most assignments will be turned in digitally on Blackboard.

During classes where I give a lecture or there is a lot of new material that you need to absorb, I will end class with a chance for you to write a murky point on a piece of paper so that I can answer any unanswered questions you still have. If they are common to many people, I will answer them in class, otherwise I will email you personally.

Academic honesty

During this semester there will be no quizzes or tests, but you will complete exercises in class and for homework. This includes downloading your own data. **Sharing files and copying and using someone else's files are violations of the Honor Code.** While I expect that you will consult with classmates about how to approach problems, the final work turned in must represent your own understanding of the material. Your final project will be completed in pairs and will be a joint effort but must represent your (plural) understanding of the material, not other classmates.

Attendance

Attendance at all scheduled class meetings is very important. The time that you spend in front of the computer with easy access to classmates, TAs, and me for help is extremely valuable for learning GIS. You are responsible for all material covered during class, whether you were present or not. If you are absent, look at what you missed on the topic schedule and discuss what we did with a classmate or me. If you are an athlete, you should give me the letter from your coach outlining what days you will need to leave early or miss class due to games as soon as you receive it. Your attendance is part of your participation grade for the class.

Computers and phones in class

Phones and other digital devices are not to be used during class time. I commit to not using my phone during your class and I need your commitment that you won't use your phone during my class.

Obviously we are going to be spending a huge amount of time in front of computers during this class. When you are in class, it is not acceptable (although it is tempting) to have email, Facebook, Twitter, or other websites unrelated to class up on the screen during class. These websites can be blocked in the computer lab and I can block more if they become a problem. **Because our time is limited, you need to be in class with your computer booted and ready to go when class starts each day so that we can get started promptly.**

Laboratory Fee

A $10 fee is charged for each Geology course with a lab. For students taking more than one lab course, that fee covers all your Geology courses in that semester. This will normally be applied to your first semester bill after ADD/DROP. If you wish to pay this and not have it applied to your bill, please see Pat Sturges in Carnegie 403 before the Friday after ADD/DROP is completed.

Resources

Textbooks and other class materials

Required text book: An Introduction to Geographical Information Systems by Heywood, Cornelius, and Carver (referred to as HC&C in the topic schedule). There are several copies available in the CARN401 seminar room and on reserve in the library that you may use. There are only a few readings from the book, so I don't recommend buying it unless you want it as a reference.

Supplemental readings, assignments, and other relevant information will be posted on Blackboard. If you will need them, bring reading assignments with your notes to class.

You must have a high speed, high capacity portable hard drive that you bring to class every day (minimum 8 GB but 100 GB or larger is better; the bigger the capacity of this drive, the less frequently you'll need to burn DVDs for backup). Students have averaged ~50-65 GB of data on their personal hard drives by the end of the semester (excluding large image files such as aerial photos). You will do all your work on this drive. Put your name on it. GIS requires significant storage space and will require careful file management. Having all your data stored on a portable drive allows you to work on any of the campus computers with ArcGIS.

Past classes have had about a 25% failure rate for hard drives, meaning that ~4 people in the class lose all their work at least once in the semester. Be sure to regularly back your data up on to your personal computer, Google Drive, another hard drive, or DVD. Every year people lose data due to hard drive failures and this could have been avoided by backing up your data. Pat Sturges can provide you with DVDs if you want to go with that option.

Blackboard

Blackboard is an online course-management system that we will use in GIS that is accessible with your ObieID. Through Blackboard, you will receive important announcements from me, communicate with me, communicate with classmates, access course materials, and participate in other activities I explain during the semester. You can login at http://blackboard.oberlin.edu.

Tutoring and other assistance

If you are in any way concerned about your ability to succeed in this course, you should get help immediately. Student Academic Services is the best resource for you to determine how to get that help, whether it is tutoring, seeing me for extra help, or help with organizing yourself to keep up with the class. They are located in Room 118, Peters Hall. More information is online at http://new.oberlin.edu/arts-and-sciences/academic-resources-and-support/student-academic-services.dot. I am happy to sign tutor forms for anyone who wants more help. You should get the help you need.

If you require special accommodations, the Office of Disability Services will provide those for you. Remember you must provide all relevant documentation to the Office of Disability Services. They will supply you with a letter to share with me so that I know what accommodations you need and can arrange to meet those accommodations. It is most helpful if we work the details out well before your need for accommodation arises. The Office of Disability Services is located in Peters G-27/G-28.

Assignments

All assignments except part of your final project (and your portfolio, if you choose) are to be turned in on Blackboard. Each major assignment will have a spot to turn it in as a **single PDF file**; some assignments will be road checks that are due in class and which I will grade for completion. I expect that you will get your work turned in on time and in exchange I will return your work to you within a few days. **If your work is late, you lose 10% per day that the assignment is late.** Even if you don't think I am grading an assignment (such as whether you downloaded data for class), I am keeping track of it as I walk around the room and check on where people are with their work. The intermediate deadlines are to help you manage your time to get projects completed on time and to make efficient use of our class time. Grading rubrics for different assignments throughout the semester are available for you to read under 'Course Documents' on Blackboard.

Readings

We will have reading assignments from three sources over the course of the semester: the textbook, Tufte (on figure design), and academic papers. BEFORE each class day when reading is assigned, read the assignment, take notes, and come to class ready to discuss the reading. I expect you to participate in class discussions, so doing the reading beforehand is essential. If you are confused about something, email me before 7:00 am on the day of class and I will be sure to cover it.

Lab exercises

Your lab assignments will include downloading data, answering questions, making maps, making work flows, and writing letters to Uncle Don (more below). There will be lab-related assignments due nearly every day the class meets. 2 labs will just require you to turn in screen shots of your work (3 points each). 8 labs will require that you download and prepare your own data (3 points each). 7 labs will have a final map product (10 points each). 8 labs have work flows (3 points each). All 9 labs have letters to Uncle Don (3 points each). These assignments are worth 151 points of your final grade.

Work flows

These flow charts show you what steps you took to complete an analysis. At least once a week we will practice making work flows for new GIS problems. You will be graded on the 8 you do for labs.

Uncle Don letters

Uncle Don is your uncle who really likes to know what you're doing in school; he gets cranky if you don't stay in regular touch with him or if your emails aren't written as real letters. He graduated from MIT with a mechanical engineering degree in 1952; his career was at Hamilton Standard working in finance. He is technically minded and loves building things and tinkering with them. Although not fabulous with computers, he does like email, playing Scrabble online, and managing his investments. He is interested in what you are learning and wants to know all the details about how you can do this spatial analysis stuff on computers. Although the concepts are new to him, he is smart and hates being talked down to about anything. All lab assignments will include writing a short letter to Uncle Don where you explain what you did in the lab and reflect on your final product (what you like, what you think you could improve on, and so on). The purpose of this exercise is to teach you to speak about your work without using jargon – an important skill if you go on to a career using GIS.

Data downloads

One of the most important aspects of this course is learning how to download and prep your own data. Part of becoming proficient at GIS is internalizing the fact that data sites are sometimes down and sometimes slow and you cannot wait until right before you need it to download your data. It is *not* acceptable to come to class and tell me that the site was down and you couldn't get the data. You *must* download your data as soon as possible after the class when the download is assigned (you can use any computer for this – including macs). If the site is down, or slow, wait a bit and try again.

Map reviews

Three times in the beginning of the semester (see topic schedule for dates; they are approximately every other week) you will read an article about figure design, discuss the principles in it, peer review each other's maps, revise your map, and write a short letter to me explaining what you revised, how you think you did with the revision, and what you would still like to change with the map. This is to practice your skills communicating science with figures. Each map review is worth 15 points.

Portfolio

This is a semester long project where you document what you learn about using GIS so that next year (or two years from now) when you next need GIS, you can easily reference all the material that you have learned previously. You will choose up to 5 times when you want Joe to look at your portfolio to make

sure you are on track. The portfolio project is worth 75 points. You will choose how much the intermediate checks and final portfolio are worth. The final portfolio is due the last class day (9 Dec).

Final project

You and a partner will complete a final project. These projects will start before fall break and will be due at the time of the final exam. You will turn in a project proposal, a mid-semester project report, a final project, and a final poster. All deadlines and the poster presentation (8 Dec) are on the topic schedule.

Participation and homework

Participation is worth 19 points (of 375) towards your final grade this semester. Class attendance, attitude in class, and participation in group discussions will be factored into your participation grade.

Grading procedures

The class is graded out of 500 points (excluding extra credit) distributed in the following way:

3 map reviews @ 15 points each	= 45
Labs	
Lab 1 @ 6 points	= 6
Lab 2 @ 12 points	= 12
Labs 3-9 @ 19 points each	= 133
Portfolio (intermediate checks and final)	= 75
Final Project	
Proposal	= 5
Mid-semester report	= 5
Final report	= 50
Final poster	= 25
Participation/homework	= 19
Total	= 375

Note: **In addition to a passing grade for the course, you are required to turn in all assignments listed above and attend the final poster session to pass the class.**

Extra credit: I will occasionally give extra credit. You may earn up to 15 extra credit points.

I will keep a running tally of your grade for the class (except participation) on Blackboard.

To determine the letter grade for an assignment or for the course:

1. Calculate your percentage based on the total possible points using this ratio: points obtained/total possible points x100 = %
2. Covert the percentage to a letter grade using the scale below:

A = 93-100%	B- = 80-82.9%	D+ = 67-69.9%
A- = 90-92.9%	C+ = 77-79.9%	D = 63-66.9%
B+ = 87-89.9%	C = 73-76.9%	D- = 60-62.9%
B = 83-86.9%	C- = 70-72.9%	F = 00-59.9%