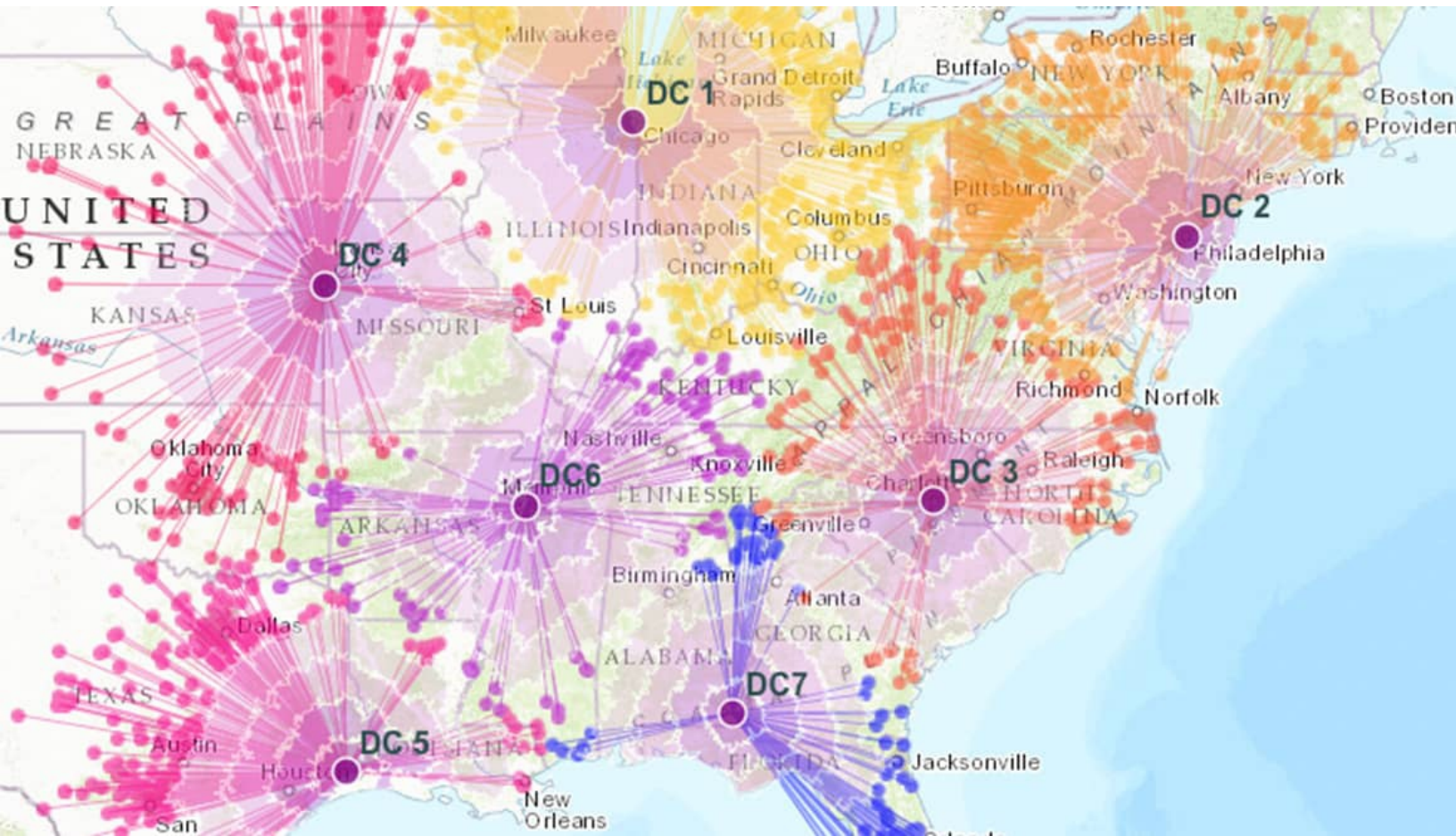
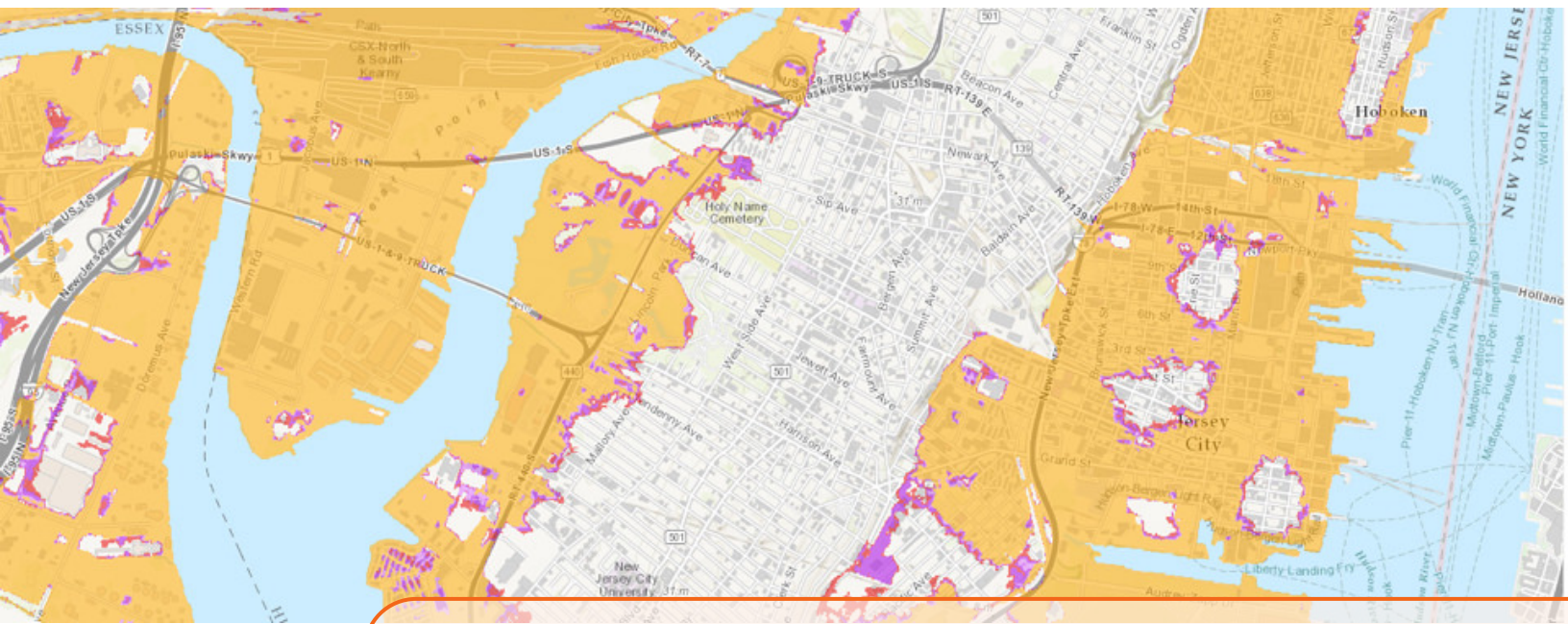


GEO157: An Introduction to Geographical Information Science

Andy Ridgwell





Course Introduction

This course will introduce you to the fundamentals of Geographical Information Systems, the Science behind them, and their practical applications. We will review and analyze geographic information systems, data structures, databases, and coordinate systems. The lectures emphasize the concepts and design of GIS and the labs will give you hands-on training with a commonly used GIS software package: ArcGIS. The goal of the course is to provide you with a good base of GIS knowledge so that you will realize the potential of GIS and hopefully use it in your own research in the future. This course, more so than any other course offered at UCR, will give you the necessary skills to pursue a career as a GIS Analyst, which is a high demand position across a variety of fields.

Course logistics

Format

The weekly format of GEO157 is: 2 × back-to-back 1½-hour lectures together with 1 × 3-hour computer practical session (all in Sproul 2225). The 3-hour computer practical class ending each week is the central element, and will consist of structured exercises leading step-by-step through GIS techniques and problems. The first lecture slot of each week will be used as tutorial and discussion time to go over the problem sets and lab material from the previous week (when set), ensuring that everyone is at the same level of understanding. Additional examples will also be worked through as needed. The second lecture of the week will then introduce the key concepts of the week.

The course follows the context and sequence of material in the course text – *An Introduction to Geographical Information Systems*. Each of

In between the Monday and Friday classes, there will be some problem sets, set. These will be set Monday am, and will be due in the following Monday (by the start of class at 9 am). Completed Friday am lab exercises (when set) will also be due in the following Friday (by 9 am).

If stuck, please make use of Office Hours (see below).

Timetable

The timetabling and overall course structure of GEO157 are given in Figure 1.

Disclaimer: This syllabus is tentative and may be subject to change. It is intended to give the student guidance in what may be covered during the quarter and will be followed as closely as possible. However, the instructor reserves the right to modify, supplement and make changes to the course as needed.

Instructors

The Instructor for the course is: [Prof. Andy Ridgwell](#).

Email: <andy@seao2.org>

The TA for the course is: [Konstantin Choumiline](#).

Email: <konstantin.choumiline@email.ucr.edu>

Office Hours

Konstantin Choumiline will hold office hours on Mondays, from 1 to 3 pm, in the GIS / Map Collection Lab (Ground Floor of Orbach Science Library)

Additional help (and general lab time) is also be available on Fridays after the class ends – Sproul 2225 has been reserved for GEO157 for an additional 2 hours from 12-2 pm, for this purpose.

You can also catch me best on Tuesdays or Wednesdays – in theory at any time, but please make an (e.g. email) appointment first¹.

¹My office is in the Geology building, room 464 (basement floor).

	Monday am (1)	Monday am (2)	Monday	Friday am	Friday
WEEK	Lecture A 09:10-10:30 Sproul 2225	Lecture B 10:40-12:00 Sproul 2225	Office Hours: 1-3 pm	LAB 09:10-12:00 Sproul 2225	Extrta lab hours: 12-2 pm
(#1) 2nd / 6th April	Course introduction Course introduction and logistics. Laptop software installation.			fake 'fieldwork' fun Paper-based and web-based GIS-like problems.	
(#2) 9th / 13th April	Lecture 1, Discussion Chapter 1: What is GIS?	Lecture 2 Chapter 2: Spatial data		Lab 1 Digitizing	
		Problem Set 1 (Ch. 1)			
(#3) 16th / 20th April	Worked problems	Lecture 3 Chapter 3: Spatial data modelling		Lab 2 GPS, Georeferencing, and Geocoding	
	Problem Set 1 due	Problem Set 2 (Ch. 2+3)		Lab 1 due	
(#4) 23rd / 27th April	Lab 2 [cont]	Lab 2 [cont] Chapter 4: Database management		Lab 3 / Lecture 4 Interpolating weather	
	Problem Set 2 due			Lab 2 due	
(#5) 30th / 4th May	Problem Sets	Library GIS visit		Lab 4 Vector analysis using earthquake data	
	Oral presentations set	Problem Set 3 (Ch. 4+5)		Lab 3 due	
(#6) 7th / 11th May	Midterm Exam (Covers Chapters 1-5)	(LAB)		Lab 5 Raster analysis using vegetation data	
	Problem Set 3 due			Lab 4 due	
(#7) 14th / 18th May	Oral Presentations	Oral Presentations		Oral Presentations	
		Problem Set 4 (Ch. 6)			
(#8) 21st / 25th May	Lecture 7 Chapter 7: Analytical modelling in GIS	(LAB) PROJECT WORK		(LAB) PROJECT WORK	
	Problem Set 4 due	Problem Set 5 (Ch. 7)		Lab 5 due	
(#9) 28th / 1st June	Memorial Day	Memorial Day		(LAB) PROJECT WORK	
	Problem Set 5 due	Project Part 1 due			
(#10) 4th / 8th June	Final Project Presentations	Final Project Presentations		(LAB) PROJECT WORK	
	Project Part 2 due				
finals 4th / 8th June	Finals Week	Finals Week		Finals Week	
	Final Project due in @ 9.00 am				

Figure 1: Timetable for GEO157. Occurrences of work being set are marked in BLUE, and hand-in deadlines in RED. Yellow == office hours / extra lab time help times. Dark grey == no class. **All hand-in deadlines are 9 am.**

Course resources

Textbooks

- **Required Text:** *Heywood, Cornelius, and Carver (2011). An Introduction to Geographical Information Systems (Fourth Edition), Pearson/Prentice Hall.*
- **Optional Text:** *Bolstad (2012). GIS Fundamentals: A First Text on Geographic Information Systems (Fourth Edition), Eider Press.*

Additional Resources (optional)

- Getting Started with GIS
<https://tinyurl.com/hgmgth2>
- Mapping Our World - ArcGIS for Desktop
<https://tinyurl.com/yc5mx4m2>
- Finding the Best Place
<https://tinyurl.com/y7qoc9ky>
- Sample Questions for ArcGIS Desktop Entry
<https://tinyurl.com/yd7a8h48>

Class Material

Throughout the quarter we will be putting course materials on iLearn for GEO157. Since you are enrolled in the class, you should be able to access this site to download class handouts, problem sets, lab exercises and announcements. We will **not** be handing out course materials regularly in class or lab, so if you wish to print any materials, you need to visit this resource **before** class.

Assessment

In-Class Problem Sets

There will be intermittent in-class problem sets based on the lecture material and content of the textbook. These are usually to be turned in at the beginning of the next class (a week after the assignment). You must present all problem sets to receive full credit – make sure that you get to class on time! NO make-up work accepted. **(10% of total grade)**

Lab Exercises

Lab exercises will be completed during the allotted lab periods and will introduce you to various problems that can be analyzed using a GIS. For most lab exercises you should be able to finish in less than the dedicated hours of lab time. Students are able to access the lab outside of regular hours if needed, and should consult the computer lab schedule. Extra assistance will be given during office hours by previous request. Late labs will be graded on a sliding scale with 25% of the score taken off the first day, if turned in after the assigned time; 50% will be deducted on the second day; and no credit will be given after that. *Turn your labs in on time!* Remember, this is a practical class! **(40% of total grade for labs)!**

Oral Presentations

In order to understand the applications of GIS, we will ask that each of you give one ten-minute presentation on a case study of GIS work. Your presentation will be worth **10% of your grade**. We will dedicate time for presentations during. As our class is small, we hope this will offer a pleasant environment to practice public speaking, and a forum to discuss the benefits, drawbacks, and details of applying a GIS to problem solving in a number of different fields. To make this easier, we will provide a preliminary list of case studies from which you can select those which interest you the most, or you can also select your own.

Final Project

An important component of the course will be to develop the skills required to propose real scientific questions and suggest solutions with the use of GIS. We expect you to use your own and/or publicly available data to produce results that will help answering the proposed question. The final result will consist of a report and an oral presentation. The evaluation criteria will be posted on iLearn. **(20% of total grade)**

Exam

Measuring ones understanding of a tool is best done through actual applications of the tool itself. As such, there will only be one midterm exam meant to emphasize the important concepts that will be introduced in the first three weeks of the course. It will include material covered in lecture and labs. Elements of the exam may, or may not, be conducted on the computer. **(20% of total grade)**

Grading summary

Final Grade: Your final grades will be based on the percentage of the total points you scored on the exams and/or homework. We plan to base your grades on the following scale, although minor discretionary adjustments may be made on a case-by-case basis.

Course components	% of total
Labs	40 %
In-Class Problem Sets	10 %
Oral Presentations	10 %
Final Project	20 %
Exam	20 %
Total	100 %

A: 93%–100%; **A-:** 90%-92.9%;
B+; 87%-89.9%; **B:** 83%–86.9%; **B-:** 80%-82.9%;
C+; 77%-79.9%; **C:** 73%–76.9%; **C-:** 70%-72.9%;
D+; 67%-69.9%; **D:** 63%–66.9%; **D-:** 60%-62.9%;
F: Less than 60%.

Make-Up Work

In general, make-up homework, lab assignments, and exams will not be allowed. No makeup work will be accepted after the due date without prior notice. If you have a planned absence, the homework or lab assignment should be turned in prior to the due date. If you have an emergency, please notify us **before** the class, lab, or exam and provide the appropriate official note explaining your absence.

Academic Dishonesty/Cheating

We will follow (and expect you to be familiar with) the University's policies on academic dishonesty. Just as you are expected to abide by all laws of this country and state regardless of whether you are aware of them, ignorance of what constitutes cheating or plagiarism will not be accepted as an excuse for improper behavior. We encourage you to discuss the problem sets and course material with your classmates, but everything that you turn in (exams and homework) must be your own work in your own words. Copying or paraphrasing other peoples work is unacceptable. In other words, if your homework or lab has the same or substantially similar wording and figures as somebody else's work, you are likely in violation of the above policy.

Some additional rules that apply during exams include:

1. Cell phones and PDAs are not allowed in exams.
2. Textbooks and notes are not allowed during exams.
3. There may be multiple exam forms. In such a case, it is prohibited to have the same exam form as a neighboring student on either side of you.

Note that violating any of the above rules (as well as any campus-wide rules) constitutes cheating.

If you have any questions as to what is acceptable, please come talk to the instructor before you make the wrong decision! Students violating any of the above policies will be reported immediately to the campus judicial affairs office.