

CRP 4080: Introduction to Geographic Information Systems for planners

Semester: Fall 2017
Location: Barclay Gibbs Jones Lab, Sibley Hall (3rd floor)
Day/time: Mondays and Wednesdays, 10:10 am – 12:05 pm
Instructor: Shoshana Goldstein (srg258)
Office: 317 W. Sibley
E-mail: srg258@cornell.edu
Teaching Assistants: Jingwen Li (jl3447), Thomas O’Sullivan (to243) & Marie del Pilar Delpino Manmon (md884)
Credit: 4 hours
Instructor Office Hours: Mondays 1-4 pm or during lab session.
TA Office Hours/Help Session: TBD, Barclay Gibbs Jones Lab

COURSE DESCRIPTION

This course is designed to provide students with a conceptual understanding of geographic information systems (GIS) and sciences, practical hands-on experience with GIS software, and understanding of how GIS can be applied to planning practice and research. Students will be introduced to the basic concepts, structures, and functions of GIS as well as their applications and limitations. Topics include classification and thematic mapping, visualization and map design; querying and editing attribute information; projections, geoprocessing, georeferencing, onscreen digitizing and editing; census data manipulation, data preparation, geocoding and address matching, geodatabases, raster and vector data models, data sources, and more.

In addition, we will also collect data using GPS devices, and explore linkages between ArcGIS, spreadsheet databases, and Google Earth. An additional session will cover alternative platforms to ArcGIS, including CARTO. During the weekly lab sessions, students will learn the basic functions of ArcGIS (version 10.5) software.

COURSE FORMAT

The class will be conducted as a lecture in conjunction with supplemental computer lab sessions, stressing hands-on application and building familiarity with the software. I will spend a portion of the class on Monday introducing the material, and then we will begin on that week’s lab. Wednesday will generally be devoted to in-class lab work, with the lab assignment due the following Monday. The purpose of the lab session is to encourage peer teaching, so get to know the people around you. I and several TAs will be present and available during the labs to provide assistance. From time to time additional material, guest speakers, or in-class demonstrations will

take place as scheduled.

Students will have access to the Blackboard site as well as the “crp4080” course folder, which you can access on the lab computers by logging in with your Cornell email address and password. Optional readings will be posted on Blackboard by weekly subject. *Remember, when logging into the course folder, you need to type your entire email address and not just your netid (e.g., abc123@cornell.edu, not abc123).* In the course folder, you will access the lab instructions, lab data, and Powerpoint lecture slides for each week. When you start a lab, first copy and paste the data onto your flash drive. Make sure you have enough space for the output files that you will produce. The recommended readings will be up on Blackboard. When you complete a lab, upload it in Microsoft Word format to the Assignments tab in Blackboard.

In order to work on the labs, you will need access to the lab on the 3rd floor of Sibley Hall, which runs ArcGIS version 10.5. The Barclay Jones Lab is open from 7:30 a.m. to 3 a.m. with the exception of some holiday breaks. It’s reserved for CRP students after 5 p.m., meaning **you need to use your id card to get in**, and if you are not a CRP or URS student, you need someone to let you in. One option, if you run into difficulties, is to use Mann Library, which also has ArcGIS installed. Another is to get a free, 1-year student license of ArcGIS for your own laptop or desktop PC. For Mac users, it’s a little more complicated. If you want your own student license, go to AAP IT Solutions, located in Sibley Dome, and they will help you get started. If you download ArcGIS to your laptop, you may bring it to the lab to use instead of the desktops.

Please note: *As per College policy, the computer lab will be closed during the Thanksgiving break. Please keep this in mind when making plans for completing the labs and working on the final project.*

READINGS (recommended)

Selections from these will be posted on Blackboard to support the lab work each week.

Maantay, J. and Ziegler, J. (2006). *GIS for the Urban Environment*, ESRI Press

Mitchell, A. (2012) *The ESRI Guide to GIS Analysis: Volume 3: Modeling Suitability, Movement, and Interaction*, ESRI Press

Longley, P., Goodchild, M., Maguire, D., and Rhind, D. (2010) *Geographic Information Systems and Science*, 3rd Edition (John Wiley & Sons).

Other

MacDonald, H. and Peters, A. (2011) *Urban Policy and the Census*, ESRI Press

Ormsby, Tim, et al. Getting to Know ArcGIS Desktop: Basics of ArcView, ArcEditor, and ArcInfo. ESRI Press.

Harvey, F. (2008) *A primer of GIS: Fundamental geographic and cartographic concepts*, The Guilford Press, London and New York

Wood, D. and Krygier, J. (2005) *Making maps: A visual guide to map design for GIS*, The Guilford Press, London and New York – *an over view of cartographic techniques*

Tyner, J. (2010) *Principles of map design*, The Guilford Press, New York and London

Kennedy, M. (2009) *Introducing Geographic Information Systems with ArcGIS: A workbook approach to learning GIS*, Wiley and Sons, 2nd ed.

Peters, A. and MacDonald, H. (2004) *Unlocking the census with GIS* (ESRI Press) Redlands, CA.

DeMers, Michael N. 2005. *Fundamentals of geographic information systems*, (John Wiley & Sons).

Zieler, M. (1999) *Modeling our world: The ESRI Guide to Geodatabase design*, ESRI Press

Nyerges, T. and Jankowski, P. (2010) *Regional and Urban GIS: A decision support approach*, The Guilford Press

COURSE GRADING

1. Problem sets (60%)

Both the lab as well as the associated data are all located on the course folder, to be accessed through the computer lab. There are 10 scheduled lab assignments. These generally consist of a lab component and a list of homework assignment deliverables, meant to be done on your own. Students should be aware they will probably need to spend time outside of class working on labs and homework assignments. Labs will usually be due the following Monday after they are assigned. Students should upload each completed lab assignment to Blackboard via the 'Assignments' link. Labs should be saved as a single **Word document** (with any maps embedded as jpegs) as your last name_lab #.doc. LATE lab assignments will automatically be downgraded unless there is a medical or family emergency:

3%: if turned in after the start of class on the day they are due

5%: if turned in the following day

10%: if turned in within 1 week

25%: after 1 week

ALL outstanding labs are due, no later than **Tuesday, December 5**. Otherwise, you will

receive a 0 for the outstanding lab(s). Try to get your work done on time, noting that TAs are students too and prefer not to spend extra time going back to grade late work. A weekly help session will be offered outside of lab hours. Students must be respectful of the TAs' time and only seek assistance outside office hours when necessary.

2. Midterm Quiz (5%)

An open book/open notes midterm quiz is scheduled for Monday, October 30th, and will cover the material up until that point. The purpose of the exam is to test student knowledge of concepts and technical material covered up until that point in the semester. No make-up will be given, except under extraordinary circumstances.

3. Final project (15%)

The purpose of the project is to provide additional experience in collecting, processing and/or analyzing spatial data and should focus on a planning analysis/research problem that requires GIS data and spatial analysis. Students may work in teams or individually. Requirements and guidelines for the final project will be elaborated on further in class.

4. Attendance/Participation/Effort (20%)

Students are expected to attend each class on Mondays and Wednesdays and ask questions/engage in discussion as appropriate. That being said, the ability to research and troubleshoot minor problems is an important skill to develop in using GIS (also much appreciated by the TAs). Interacting with and supporting others is part of the learning process, so please help each other solve problems and feel free to ask TAs for assistance when you get stuck. A sign-in sheet will circulate the room each day to note your attendance. If you risk getting others sick, experience a family or other type of emergency, do not come to class. Your participation grade is not based solely on your attendance. However, if you never come to class, this will affect the participation portion of the grade, and your absence will probably be reflected in the quality of your work in other areas.

ACADEMIC INTEGRITY

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student's own work. While helping each other is encouraged, your labs are individual assignments. Direct quotations of other work(s) should be enclosed with quotation marks, with a citation afterward and page number of the work where available. When you rely substantially on another person's work without quoting from it directly, please use in text citations at the end of an appropriate section. Failure to provide complete and proper citations may constitute plagiarism, which violates the Cornell Code of Academic Integrity. If detected, plagiarism may result in a failing grade for the course.

STUDENTS WITH DISABILITIES

In compliance with the Cornell University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for under unusual circumstances. You can view the Guide online at newstudentprograms.cornell.edu/AcademicIntegrityPamphlet.pdf

STRESS

If you are experiencing personal or academically related stress at any time during the semester, I encourage you to seek support early on. I am available to talk with you if you experience stress related to the class. Additionally, I can assist you in reaching out to any one of a wide range of campus resources, including:

Student Services Office, 255-6376

Cornell Learning Strategies Center at 255-6310, <http://lsc.sas.cornell.edu>

Gannett Health Services at 255-5155, www.gannett.cornell.edu

Let's Talk Drop-In Consultation and Support www.gannett.cornell.edu/Let'sTalk

Peer Support provided by Empathy Assistance and Referral Service at 255-EARS

CLASS SCHEDULE: This is a tentative schedule, which is subject to revision by the Instructor.

Dates	Lecture Topics	Lab Assignments	Homework Due/Other activities	Recommended Readings
Aug 23	Introduction to course & review of the syllabus			
Aug 28– Aug 30	Introduction to ArcGIS	Lab #1 Introduction to ArcGIS <ul style="list-style-type: none"> ● Creating a unique classification ● Creating a layout ● Standard color classifications for land uses 	Lab #1 due Wednesday, Sep 6	Zeiler: Ch. 1 Longley et al.: Ch. 1&2 GIS Commons eText: http://giscommons.org/introduction-concepts/

				http://giscommons.org/chapter-2-input/
Sep 6 – Sep 13	Thematic mapping	Lab #2 Thematic Mapping <ul style="list-style-type: none"> • Creating a shapefile • Querying data • Classification schemes • Uni and Multivariate maps (No Class on Monday, 9/4—Labor Day)	Lab #2 due Monday, Sep 20	Longley et al.: Ch. 12
Sep 18 – Sep 20	Projections	Lab #3 Map Projection <ul style="list-style-type: none"> • Understanding Map Projections • Project on the fly • Define a projection • Project Data 	Lab #3 due Monday, Sep 25	Maantay and Ziegler: Ch. 2, pp. 39-53 Longley et al.: Ch. 5 Harvey: Ch. 4&5 GIS Commons eText: http://giscommons.org/earth-and-map-preprocessing/
Sep 25 Sep 27	Cartography	Lab #4 Cartography <ul style="list-style-type: none"> • GPS data into Excel • Building and editing cartographic representations • Customizing legend 	Lab # 4 due Monday, Oct, 2	Longley et al.: Ch 14
Oct 2 – Oct 4	Geoprocessing	Lab #5 Geoprocessing <ul style="list-style-type: none"> • Dissolve • Clip • Intersection/Union • Buffers • Merge 	Lab # 5 due Monday, Oct, 16	Maantay and Ziegler: Ch. 2, pp.26-29 Longley et al.: Ch. 3&8
Oct 11	Open Source Platforms	(No Class on Monday, Oct 09—Fall Break) Guest Lecture on Wednesday, Oct 11: Intro to CARTO		
Oct 16 – Oct 18	Data models	Lab #6 Georeferencing and On-screen digitizing and editing <ul style="list-style-type: none"> • Georeferencing images and 	Lab #6 due Monday, Oct 23	Longley et al.: Ch. 10

		<p>CAD files</p> <ul style="list-style-type: none"> • Creating and editing shapefiles. • Creating attribute information • On-screen digitizing 		
Oct 23 – Oct 25	Manipulating census data	<p>Lab #7 Census Data Analysis</p> <ul style="list-style-type: none"> • Downloading data and boundary files • Creating and editing features and attributes • Joining and relating tables • Selecting features by attributes and location 	Lab #7 due Monday, 10/30	Maantay and Ziegler: Ch. 2, pp.29-38 MacDonald and Peters: Ch. 1&2
Oct 30	Midterm	Open-book midterm	Final project proposal due Nov 1	
Nov, 1– Nov, 8	Intro to Global Positioning System	<p>Lab #8: GPS</p> <ul style="list-style-type: none"> • Using GPS units and collecting waypoints and routes • Integrating data into Arc with DNR-GPS 	Lab #8 due Monday, Nov, 13	
Nov, 13 – Nov, 15	Geocoding and Address Matching	<p>Lab #9: Geocoding</p> <ul style="list-style-type: none"> • Inputting GPS coordinates • Geocoding • Rematching addresses • Creating a Geodatabase • GoogleEarth and ArcGIS 	Lab #9 due Monday, Nov, 27	Longley et al.: Ch. 4&6
Nov 20 – Nov 29	Introduction to Raster Data	<p>Lab #10: Intro to Raster</p> <p>(No Class on Wednesday, 11/22— Thanksgiving Break)</p> <p>Last day of class: 11/29</p>	Lab #10 due Friday, Dec, 1	

--	--	--	--	--

***Final Projects due Monday, December 4