UP 418 GIS for Planners

Lecture: Tuesdays 2:00p - 3:20p, Wohlers Hall Room 130
Lab sections: Thursdays, 2:00p - 3:20p; Wohlers Hall Room 70

Course webpage: compass2g.illinois.edu

Instructor: Natalie Prochaska (prochask@illinois.edu)
Office hours: Tuesday 11:00a - 2:00p in 310 Noble Hall (Map: http://bit.ly/tbhtonoble)
Mailbox: Department of Urban and Regional Planning Office, 111 TBH

Teaching Assistant: Jasmine Thomas (jpt3@illinois.edu)
Office hours: Monday 12p - 2p in Temple Buell Hall Room 227 (Map: http://bit.ly/2bcjmvJ)

Course Description

This course will provide students with an introduction to Geographic Information Systems (GIS). It is primarily intended for students in Urban and Regional Planning, but students from other programs will also get good exposure to the capabilities of GIS. Over the course of the semester, this course will cover five interrelated areas:

1. Introduction to the basic concepts of GIS and its data structures
2. Use of ESRI ArcGIS 10.4 software with spatial data
3. Basic concepts of cartography and the presentation of spatial data
4. Basic concepts in the analysis of spatial data
5. Practical applications of GIS for urban and regional planners

The course is designed to teach a mix of practical skills and fundamental concepts that planners should understand if they intend to use GIS in their work. The first half of the course focuses on basic GIS skills, while the second half focuses on using GIS for analysis.

Course Format

This is a 16-week / full semester course. Each week consists of one lecture session and one lab session. Students are required to attend lab sessions for full credit – attendance will be taken.

The lectures will focus on important concepts in GIS and the labs will focus on developing practical skills. Learning to use ESRI ArcGIS software is a major part of this class. Because learning new software takes time, students are expected to spend several hours each week (outside of assignments and lab sessions) working with ArcGIS in order to become proficient users.

Students are also required to submit weekly assignments from the required textbooks.

Texts

The texts for this course are listed below. *GIS Tutorial 1: Basic Workbook* and *GIS Tutorial 2: Spatial Analysis Workbook* are designed for use with ArcGIS version 10.3. These workbooks provide the data and instructions needed to complete the Workbook Assignment assignments. Readings will be assigned from the other three books in order to further illustrate important GIS concepts covered in lectures. Assigned readings and lessons for the week should be completed prior to completing the Workbook Assignment and lab exercise. The books are available in campus bookstores and from online booksellers. **Please be sure to purchase the correct editions. Also make sure that the books have the accompanying DVD/CDs as the data for the workbook assignments will be on the accompanying disks.** I will also post any additional readings on the course website.

The books are abbreviated in the syllabus as follows:

***GT-1** Gorr, W. L., & Kurland, K. S. (2013). *GIS Tutorial 1: Basic Workbook. 10.3 edition* Redlands, CA: ESRI Press.

***GT-2** Allen, D. W. (2013). *GIS Tutorial 2: Spatial Analysis Workbook, 10.3 edition* Redlands, CA: ESRI Press.

EGGA-1 Mitchell, A. (1999). *The ESRI guide to GIS analysis: geographic patterns & relationships* (Vol. 1). Redlands, CA: ESRI.

EGGA-2 Mitchell, A. (2005). *The ESRI guide to GIS analysis: spatial measurements & statistics* (Vol. 2). Redlands, CA: ESRI.

GSGIS Clarke, K.C. (2011). *Getting Started with Geographic Information Systems*. Fifth Edition. Prentice Hall.

*Required Texts

Software

Students can install ArcGIS version 10.4 or 10.5 on their personal computers for free through the University's Webstore: webstore.illinois.edu. The workbooks will work with either version.

This course uses ESRI's ArcGIS 10.3/10.4 software.
On-Campus machine locations:

1. Computers in the ACES Library Academic Computing Facility have ArcGIS 10.4 installed on them. Besides the class time, you can use the computers there throughout the semester during specific lab hours (http://acf.aces.illinois.edu/hours/fullhours.html). You

can also remotely access those computers (http://acf.aces.illinois.edu/remote/index.html) for using ArcGIS.

2. Computers in Urban Planning computer lab (227 TBH) also have ArcGIS 10.4 installed on them. TBH and the room 227 computer lab are available to you at all times when classes are not scheduled, though you will need your student ID to unlock the doors at night and on weekends (swipe your card at the western door to TBH). After-hours access should be automatic with enrollment in UP418, although for non-DURP students access may not be authorized. Please inform me if you are not able to access the building or lab.
3. Other campus labs with ArcGIS 10.4 or 10.5 include the ATLAS Open Computer Lab (http://www.atlas.illinois.edu/services/rooms/labs/) in room G8b Foreign Languages Building and 2043 Lincoln Hall.

Please inform me ASAP if you have any issues with installing ArcGIS if you decide to do so on your personal computer.

Worth repeating: You have the option of doing all ArcGIS work via internet and not installing the software on your personal computer (e.g. because of hardware or storage limitations). You can VPN into campus servers, then login to TBH 227 computer, save to Box and work entirely from the cloud.

Course Compass Site

The course website is hosted on Compass. You can access the site by going to compass2g.illinois.edu. Use your NetID and AD password to log in to this site. If you are not sure what your AD password is, refer to this site: www.cites.illinois.edu/accounts/index.html. The Compass site contains the syllabus, lecture slides, course handouts, lab instructions and any necessary data for assignments. You will use Compass to upload your weekly assignments throughout the semester. You can also use the Q&A Forum in Compass for any query related to the lectures, assignments, or data issue. You can post your query there or can reply to any thread created by other students.

Assignments

Workbook Assignments

Workbook Assignments are generally due on ***Wednesday at midnight*** following the week they are assigned. For example, assignments listed under the week of August 28th will be due by Wednesday, September 6th at 2:00 pm). Specific due dates are listed in the class schedule section of the syllabus. These assignments will be submitted electronically on the course's Compass site and are due by 2:00 pm on the due date.

Students must submit all workbook assignments as a Word document. Upload the maps/GIS outputs onto a Word document along with any answers to questions. In some weeks, multiple Workbook Assignments are due. Students must upload all assignments into the same Word document with the proper demarcation for each assignment.

File submissions should be named with your last name, followed by your first name and the assignment number (as listed in this syllabus). For example, my submission for the first week's assignment would be titled "ProchaskaNatalieWorkbook1.doc".

Lab Exercises
In addition to the Workbook Assignments, we will also have lab exercises each week. In the lab exercises you will be asked to create maps with specified criteria or answer certain questions based on the week's lecture and readings. Lab exercises are due at the same time and according to the same procedure as the weekly Workbook Assignments as stated above. Any special instructions for the lab exercises will be given within the lab narratives.

Lab submissions should be named with your last name, followed by your first name and the assignment number (as listed in this syllabus). For example, my submission for the first week's assignment would be titled "ProchaskaNatalieLab1.doc".

Midterm exam
The midterm exam will take place during the ninth week of the course: on October 24. (THIS MEANS YOU GET TO ENJOY HALLOWEEN PARTIES TO CELEBRATE AFTERWARDS!) Part one will be a traditional written exam aimed primarily at testing mastery of GIS concepts. Part two will be an applied exam to test your ability to use the software and employ cartographic techniques. Part one of the exam will take place during the weekly lecture session and Part two will take place during the lab session.
A study guide will be provided to review.

*Final project**
The final project will be a self-designed group project using GIS. As part of the final project, students are required to: 1) choose groups; 2) submit a brief project proposal; 3) write a final paper; and 4) present their research.

1) Groups must be determined by the sixth week of the course: by October 2nd. Groups may consist of 3 to 5 people. Please email me a list of group members by October 2nd.
2) **Groups are required to turn in a brief project proposal (roughly one-half page) by October 30th.** Students are encouraged to discuss the proposal with the instructor during office hours or during another scheduled time.
3) A final written paper is also required that describes what you did, how you did it, what you learned about your chosen topic, and why it is important.
4) Students are required to present their final project in class during the final week of the semester.

The final project is due by 9:00 pm on Monday, December 18th on the Compass course website. Full instructions for the final project will be posted on Compass in a separate handout.

*Note: PhD students have the option of doing the group project or doing their own project.

Assignment Submissions
Unless otherwise noted, assignments and labs will be released on Compass on Wednesday of each week. Lecture slides will be released approximately one hour, at the earliest, before the Tuesday lecture session. The Workbook Assignments and Lab Exercises will be due by the following Wednesday (or Friday for the final week) at 2:00 PM beginning September 6th until November 27th.
The Final Project Proposal will be due by Wednesday November 8th at 2:00 PM.

***Other than the Midterm, Final Project Proposal, and Final Project; students must complete and submit each of the following week (by the following Wednesday at 2:00 PM):**
1) Workbook Assignment(s)
2) Lab Exercise(s)

Grading

Workbook Assignments
Workbook Assignments will be graded with a score between 0 and 5. All students should be able to earn scores of 5, which signify full-credit and indicate carefully completed assignments with no major omissions and few major errors. Scores of 2 are awarded when significant parts of the assignment are incomplete or there are several major errors. A score of 0 is given for assignments that are not turned in on time or are egregiously inaccurate. Submitting the incorrect assignment will also result in a grade of 0, so make sure to review the Workbook Assignment submission requirements carefully.
Grades will be posted on Compass within two weeks of due dates.

Lab exercises, midterm exam, Final Project Proposal and final project
These assignments will be graded with a point value. The number of possible points will also be reported so that an approximate letter grade can be calculated for these assignments. Lab exercises will be worth up to 15 points each. Each Lab Assignment instruction lists the requirements and point distributions.

The Final Project Proposal will be worth up to 10 points. Students will receive 10 points for submitting the proposal as required **AND** meeting with the instructor. Students will receive 0 points if they do not submit the proposal with the necessary requirements **OR** do not meet with the instructor. Students must do both to receive the 10 points.
The Midterm Exam will worth up to 180 points.
The Final Project will be worth up to 200 points.

Late work

Late work is not accepted. The only acceptable excuses for late work are an absence letter from the Emergency Dean (www.odos.uiuc.edu/emergency/), a doctor's note, or permission from the instructor.

Attendance & Participation
Attendance for both the lecture and lab sessions is mandatory. Students are required to attend all lectures and lab session and arrive on-time for both.

Participation also requires students to actively pay attention in lectures and labs. This involves not using cellphones (for anything other than emergency purposes), not holding personal conversations, using laptops for anything other than note-taking, and/or just general disruptive behavior.

Irregular Attendance
Class attendance is expected of all students at the University of Illinois, however instructors must reasonably accommodate a student's religious beliefs, observances, and practices in regard to class attendance and work requirements if the student informs his or her instructor of the conflict within one week after being informed of the attendance or work requirements.
It is the instructor's decision as to when a student's absences become excessive and should be reported. If in the opinion of an instructor the attendance of a student becomes so irregular that his or her scholarship is likely to be impaired, the instructor may submit an irregular attendance form to the Associate Dean of the student's college. A copy is forwarded to the student, who should contact the instructor immediately to work out a solution. If irregular attendance continues without excuse, the instructor may request the student be withdrawn from the course. This request for withdrawal would result in a grade of E for the course. Extenuating circumstances will always be considered when supporting evidence is presented. See Rule 1-501 and Rule 1-502 in the Student Code for more information.

Extra Credit
Extra credit will be given for students who complete the Extra Credit assignments as listed on the syllabus and any extra credit assignments given throughout the semester.
Refer to the Class Schedule below for the list of the Extra Credit Assignments.
Extra Credit Workbook Assignments are worth 2 points and Extra Credit Labs are worth 5 points.

All Extra Credit assignments are due the week for which they are assigned, the same as the regular assignments for the week.

Final grade
Final letter grades (A+ to F) will be awarded based on a point value. The **Maximum Number of Possible Points** are derived from the following:

Workbook Assignments	30/5 Points Each
Lab Exercises	195/15 Points Each
Final Project Proposal	10 Points
Midterm exam	180 Points
Final project	200 Points
Attendance	40 Points

Working Together

Working together is encouraged. You will gain important insights from reviewing each other's work and discussing problems you encounter in learning GIS. However, each student must complete assignments without relying on another student to actually complete the work. For example, it is acceptable to ask a classmate how to format a certain data set. It is not acceptable for your classmate to format the data for you.

Office hours and meetings

The instructor will maintain specific office hours throughout the Semester. The instructor's office is located in Noble Hall room 310. The office hours will be on Tuesdays from 11:00a to 2:00p. Students are strongly encouraged to drop in during this time slot.

The TA will also maintain specific office hours: Mondays from 12:00p-2:00p in the TBH computer lab in Room 227, or by appointment.

Email Policy

The instructor and TA will also be available to answer questions by email. Questions or issues concerning grades, assignments, or general course information should be submitted through email. In responding to emails, please allow up to 48 hours for a response. This time period will allow the instructor and TA to have enough time to adequately address your issue.

When emailing, please put the class name followed by a short description of the issue in the subject line. For example: "UP418: Final Project Proposal". This will create a reference that we can easily pull back up.

Professionalism in the Department of Urban and Regional Planning

The Department of Urban and Regional Planning (DURP) is committed to creating an environment of inclusion and opportunity that is rooted in the responsibility of practicing planners to adhere to the highest standards of professionalism and integrity while serving the public interest. DURP expects all students to meet the goals outlined in the American Institute of Certified Planners (AICP) Code of Ethics and Professional Conduct for planners (www.planning.org/ethics).

We (I, Natalie Prochaska, and DURP faculty generally) very much care about your mental, emotional and physical health!
Please reach out to the counseling center if you start struggling at all with work-life balance (https://counselingcenter.illinois.edu/). I am happy to meet with you as well, and will always consider your individual circumstances before enacting any of the harsher (required UIUC) guidelines outlined above. "*The Counseling Center is committed to providing a range of services intended to help students develop improved coping skills in order to address emotional, interpersonal, and academic concerns. The Counseling Center provides individual, couples, and group counseling. All of these services are paid for through the health services fee. The Counseling Center offers primarily short-term counseling, but they do also provide referrals to the community when students could benefit from longer term services."*

University Student Code

The University of Illinois Student Code applies to all conduct in this class (admin.illinois.edu/policy/code).

Course Policies

Please remember to turn off cell phones before lectures and labs.
The use of computers in class must be for note-taking.
Please be considerate of your fellow students and instructor by being on time to class.

To earn a desirable grade, students are expected to:

- Attend all lectures and labs
- Actively participate in lectures and labs (no cell phone use, no inappropriate computer/laptop use, no outside conversations)
- Ask questions
- Be on time to lectures and labs
- Take the necessary time to understand GIS concepts
- Remember that everything submitted be of professional quality (i.e.; proper email structure, maintaining proper map layouts and design, etc.)
- Practice, Practice, Practice

This syllabus is subject to change by the instructor.

Class Schedule

Part 1 – Basic GIS Skills

Week 1 – August 28
Introduction
Lab: Basic ArcGIS Functions (DUE September 6th)
Required Workbook Assignment: GT-1 Chapter 1: A1-1 (DUE September 6th)
Extra Credit Workbook Assignment: GT-1 Chapter 1: A1-2
Recommended Reading: GSGIS Chapter-1

Week 2 – September 4
GIS Data Structures
Lab: Querying, selecting, joining, and calculating data (DUE September 13th)
Required Workbook Assignments: GT-1 Chapter 4: A4-1 (DUE September 13th)
Extra Credit Workbook Assignment: GT-1 Chapter A4-2
Suggested Workbook Assignments: GT-1 Chapter 1: Tutorials 1-3:1-9; and Chapter 4: A4-4
Recommended Reading: GSGIS Chapters 3 and 5

Week 3 – September 11
Basics of Cartography & Data Classification and Symbology
Lab: Basic map design (DUE September 20th)
Required Workbook Assignments: GT-2 Chapter 2: Exercise 2-3 (DUE September 20th)
Extra Credit Workbook Assignments: GT-1 Chapter 2: A2-3 and GT-1 Chapter 3: A3-2
Suggested Workbook Assignment: GT-2 Chapter 3: Exercise 3-2 and GT-2 Chapter 2: Exercise 2-2
Recommended Reading: GSGIS Chapter-7

Week 4 – September 18
US Census Data for GIS & GIS data and analysis for planning and public policy
Lab Mapping Data & Data acquisition and preparation (DUE September 27th)
Required Workbook Assignment: None
Extra Credit Workbook Assignment: None
Recommended Reading: GSGIS Chapter 2

Week 5 – September 25
Creating and Editing GIS data, Geocoding
Lab: Retail Market Analysis and Georeferencing (DUE October 4th)

Required Workbook Assignment: GT-1 Chapter 8: A8-1 (DUE October 4th)
Extra Credit Workbook Assignment: None
Suggested Workbook Assignment: GT-1 Chapter 7: A7-1 and A7-2
Recommended Reading: EGGA-1 Chapter 2, 3 and 4

Week 6 – October 2

Scale, Projection and Coordinate Systems
Lab: Working with coordinate systems (DUE October 11th)
Required Workbook Assignment: None
Extra Credit Workbook Assignment: GT-1 Chapter 5: A5-1
Recommended Reading: GSGIS Chapter-4

Please email me (prochask@illinois.edu) your Final Project group list by Monday, October 2nd

Week 7 – October 9

Spatial data processing and Midterm Review
Lab: None; Midterm Review & Projection & Coordinate Systems Review
Required Workbook Assignment: None
Extra Credit Workbook Assignment: GT-1 Chapter 6: A6-1
Suggested Workbook Assignment: GT-1 Chapter 6: A6-2
Recommended Reading: GSGIS Chapter-6

Week 8 – October 16

Distance measurement and descriptive spatial statistics
Lab: Tracking and spatial distribution of population (DUE October 25th)
Required Workbook Assignments: None
Extra Credit Workbook Assignment: GT-2 Chapter 7: Exercises 7-1; GT-2 Chapter 7: Exercise 7-2 and Exercise 7-3
Suggested Workbook Assignment: GT-2 Chapter 5: Exercise 5-5
Recommended Reading: EGGA-1 Chapter 6 EGGA-2, Chapter 1 and 2

Week 9 – October 23

Midterm Exam: October 24th during class

******Final project proposal guidelines released on October 23rd***

Part 2 – Analysis using GIS

Week 10 – October 30

Change detection using vector and raster data
Lab: Development tracking and population projections (DUE November 8th)
Required Workbook Assignment: None
Extra Credit Workbook Assignment: GT-2 Chapter 6: Exercise 6-2
Suggested Workbook Assignment: GT-2 Chapter 6: Exercise 6-1
Recommended Reading: Lu, D., Mausel, P., Brondízio, E., & Moran, E. (2004). Change detection techniques. International Journal of Remote Sensing, 25(12), 2365-2401. – Posted on Compass

Week 11 – November 6

Measuring Network Distance and Cost
Lab: Emergency Response Planning (DUE November 15th)
Required Workbook Assignment: None
Extra Credit Workbook Assignment: GT-2 Chapter 5: Exercise 5-8
Suggested Workbook Assignments: GT-2 Chapter 5: Exercise 5-6 and Exercise 5-9

******Final project proposal due by Wednesday November 8th at 2:00 PM***

Week 12 – November 13

Multiple Criteria Evaluation for Planning & Public Policy
Lab: Urban Agriculture Suitability (DUE November 22nd)
Required Workbook Assignment: None
Extra Credit Workbook Assignment: None
Reading: Malczewski, J. (2004). GIS-based land-use suitability analysis: a critical overview. *Progress in Planning, 62*(1), 3-65. – Posted on Compass, read Ch. 3-6, pp. 20-58
Banai-Kashani, R. (1989). A new method for site suitability analysis: The analytic hierarchy process. *Environmental Management, 13*(6), 685-693. – Posted on Compass

THANKSGIVING BREAK: NOVEMBER 20

Week 14 – November 27

Solving Location-Allocation Problems
Lab: Locating Rural Healthcare Facilities (DUE December 6th)
Required Workbook Assignment: None

Extra Credit Workbook Assignment: None
Reading: McLafferty, S. L. (2003). GIS and health care. *Annual Review of Public Health, 24*(1), 25-42. – Posted on Compass

Week 15 – December 4
Using and Sharing GIS Data Online & Presentations
Lab: Food Desert Analysis (Extra Credit)
Required Workbook Assignment: None
Extra Credit Workbook Assignment: None

Week 16 – December 11
Where do we go from here? Further uses of GIS
Presentations
Required Workbook Assignment: None
Extra Credit Workbook Assignment: None

Final projects due Monday, December 18th by 9:00 pm on the Compass course website