

UPP 462 Intermediate GIS

Instructor: Yochai Eisenberg (yeisen2@uic.edu)

There are two sections of this course and both meet in AEH 2201.

<i>Day and Time</i>	<i>Undergrad CRN</i>	<i>Graduate CRN</i>	<i>Class Location</i>	<i>Instructor</i>
Tuesday 9:30-12:15 pm	32217	32218	AEH 2201	Yochai Eisenberg
Wednesday 9:00-11:45 pm	37555	37586	AEH 2201	Yochai Eisenberg

Office Hours: Office hours by appointment. Students are asked to request office hour appointments at least 24 hours in advance by email.

GA Office Hours: TBA

Goals: The goals for this course are that you will learn how to be an effective and independent GIS analyst. You will learn advanced data management, spatial analysis, and visualization capabilities of ArcGIS to answer questions of a geospatial nature.

Also, as one of the courses that satisfies a requirement for the GSAV certificate, this course has been designed to be consistent with the objectives of the GSAV certificate program:

The campus certificate program in Geospatial Analysis and Visualization (GSAV) will develop students' skills in the spatial analysis and visualization of data, including analyzing the relationships, interactions, and the development of maps and models that communicate complex information to their audiences.

Source: GSAV web page at
http://www.uic.edu/cuppa/upp/academic_programs/certificate_programs.html#overview

Expectations of Students: We expect that you:

- Will bring with you a solid understanding of the basic capabilities of ArcGIS desktop as presented in UPP461 (introduction to GIS for planners)
- Will take responsibility for your own learning
- Will work collaboratively with classmates on some projects
- Will produce high quality work commensurate with graduate level study

Topics Covered: Coordinate Systems, Advanced features of geodatabase, Creating and editing features, Network Analyst Extension, Spatial Analyst Extension, Spatial Statistics, ArcGIS Online, and ModelBuilder.

In addition, we will cover the use of web based data services such as census.gov and the City of Chicago data portal as well as methods of data compilation.

The pace of this course is fast. Because many of the lessons build upon previous assignments, students are expected to meet deadlines and request assistance when necessary.

GIS Instructors at CUPPA and Our Philosophy:

Instructor: Yochai Eisenberg is a research coordinator at the UIC Center for Health Promotion Research for Persons with Disabilities. He uses GIS to study the impact of the built environment on the health of persons with disabilities and other fun GIS/GPS projects as well.. He received his MUPP from CUPPA in 2008 and has been teaching at the UDVL since 2010.

Yochai spends free time gardening with his 3 girls and slowly but surely working toward a PhD in Public Health.

Other Folks:

Graduate Assistant – Nabil Nazha

GIS Specialist: Nina Savar has worked in GIS and data “wrangling” for over 28 years. She has been in UIC’s Urban Data Visualization Lab for the past 10 years. Previously employed by the Northeastern Illinois Planning Commission (NIPC), Nina starred in the role of GIS Manager, ARC/INFO specialist, and metadata evangelist. She holds a Masters in Geography.

Because of our varied experiences, we bring different points of view to many data analysis topics. We constantly challenge what we know and believe these challenges strengthen our understanding of the finer points of GIS. Our expectation is to expose students to smarter ways to work with data. Even more than our introductory course, this course is a collaboration between teacher and students. We will all learn from each other.

Student Evaluation: Student performance will be evaluated on the basis of homework, three projects, and two presentations. The relative weights are listed below:

20 points	Homework	Short assignments on key topics
25 points	Project 1	Replicate methodologies from research articles
25 points	Project 2	Special topics in GIS
30 points	Project 3	Use of new GIS tools for individual project

If you cannot make a class, you are still responsible for the material covered. There will be more materials posted on Blackboard than we will cover in class and you will be responsible for those materials.

Format of Class Sessions: With the exception of those nights that we will have student presentations, class time will be organized as follows:

- Discussion and review of previous weeks material
- Brief lecture on new topic
- Exercise on new topic

The discussion and review will allow students to work together and with the Instructor to consolidate their learning on the previous week's topic.

Homework: There will be 4-5 graded assignments during the course that will be worth a 2-5 points each. Additionally, each week ESRI virtual campus courses will be assigned. It is highly recommended that students complete these courses in order to prepare for the upcoming class as there is no textbook as part of UPP462.

Project 1: Replication: The purpose of this assignment is to apply the skills taught for network analyst by attempting to replicate a GIS methodology that was developed for a research article. Published research articles are excellent ways to learn how GIS is applied to study current urban problems from food access, to transportation shortages and from walkability to space station suitability. The peer review process helps ensure that the GIS methods used are of a high quality.

You will be given a Research Article. You will have 2 weeks to study it and work to replicate the methodology using local data for the Chicago area/or the same data the authors utilized. You will prepare a summary document of your process and how well the methods worked. You will report on your findings and how similar they were to the original paper.

Deliverables will include a 5-page report, Appendices, and project log.

Project 2: The Special Topics Presentation: The purpose of this presentation is for each student to master and then demonstrate the use of a GIS *tool, service, method,* or piece of GIS-relevant *equipment* that is not covered in the course. Each presentation will run approximately 15-25 minutes (depending on number of presentations) including a 5 min Q & A session. Presentations should not include live demonstrations, but instead should rely on visual aids (typically PPT slides with speaker notes) comprised of screen shots and images to illustrate its use.

In addition, you will prepare a class exercise that classmates can do to learn your special topic. You will provide enough instruction and data so that we can learn the basic functionality of your topic. A classmate will run through the exercise you've prepared as part of the assignment and provide some feedback.

Your deliverables will include a PowerPoint presentation (with speaker notes complete enough to understand the topic), the class exercise, data for the exercise, and a complete answer key.

Project 3: Individual Research Project: The purpose of this final project is for students to demonstrate their ability to integrate multiple GIS tools to address some question - hypothetical or real - of a geospatial nature. Students will use the tools learned in this class along with other tools not covered in class. The objective of these projects is to demonstrate your competency in GIS.

In each case, your analysis will need to incorporate multiple GIS tools from Network Analyst, ModelBuilder, editing, Spatial Statistics, and/or Spatial Analyst that meet an acceptable degree of complexity. Students will pick from several different options that will be at varying levels of difficulty. Students can choose to focus on one of the more complex tools, or several of the less complex tools. Students are encouraged to leverage tools and techniques presented from Special Topics presentations.

The final project will commence in phases:

Students will submit a brief proposal to the Instructor who will review and authorize the student to continue. The proposal will identify the problem, data sources, reference material, and the anticipated tools and methods employed to answer the question they have raised. The following week students will hand in a flow chart describing their planned approach in more detail. Students will prepare an oral presentation to be made to the class. Students will be encouraged to prepare an ArcGIS online Storymap.

Deliverables will include the proposal, oral presentation (which includes something like Powerpoint with speaker notes), flow chart, final map and project log.

Submitting Assignments: Unless otherwise arranged, the assignment submission link in Blackboard is the only accepted method of assignment submission. Each assignment will have its own folder in the classes folder for that week. Assignments must be submitted to Blackboard by 5 p.m. the day before the next class meeting unless otherwise specified.

Late assignments, without prior approval from Instructor, will receive ½ credit on assignments. Oral presentations and reports are due the day of the presentation. Late submissions will have points deducted.

Graded assignments will be returned within one week of submission.

Please use the following naming convention when submitting files:

Lastname_Assignment_YYYY_MM_DD

If multiple documents of the same file type are submitted, make sure they are clearly named:

Savar_Homework1Map_20140826.docx, Savar_Homework1ProjectLog_20140826.docx

Working Together: The instructors believe that it is more effective to comprehend and absorb the course content if you work with partners. We strongly urge you to work with your classmates both in the class/lab as well as outside of class. It is easy to get stuck in the logic of GIS operations. Partners should be able to push their way through what otherwise might be very frustrating challenges.

BUT A CAUTION: It must be evident to the instructors that what you hand in is your own work. The point here is to work together to figure out how to do the exercises but to do them on your own. Note that the University of Illinois at Chicago Guidelines Regarding Academic Integrity state that: “All members of the campus community—students, staff, faculty, administrators—share the responsibility of insuring that these standards are upheld...Academic dishonesty includes, but is not limited to: cheating, fabrication, facilitating academic dishonesty / plagiarism, ... , nonoriginal works.” (The full guidelines are available online at <https://catalog.webhost.uic.edu/ucacat/cat1315archive/GR.shtml#qa>.)

Getting Help:

1. Search for solutions in the ArcGIS help menu, at the ESRI Support website, other GIS forums, or use a general internet search.
2. Ask classmates. We suggest you work on homework, projects, and self-paced tutorials in groups. Collaboration is your best friend and an effective learning method. When you are required to submit something, however, you must submit your own work.
3. Pose your question to the Discussion Forum in Blackboard. This will give classmates as well as your Instructor an opportunity to respond to your question.
4. Email your Instructor with your question
5. Make an appointment.

Required Software & Materials: All work will be conducted using ArcGIS Desktop version 10.4.1 at the Advanced license levels.

ArcGIS software is available for download at the University of Illinois' Webstore <http://webstore.illinois.edu>. The Webstore's ArcGIS Desktop license level is Advanced.

Alternatively, we will distribute a free ArcGIS Desktop version 10.4.1 Advanced level student license. Installation guides for basic installation are available on **Blackboard GIS 101**.

Flashdrives: You will need a USB flash drive with at least 4 Gb of free space.

Other Resources: In addition, a series of pdf's with tutorials and other information will be uploaded to Blackboard.

Online Assignments/ESRI Virtual Campus: Many lectures are supplemented by online instruction via the ESRI online resource named the "Virtual Campus." These may be explicitly assigned to you or you may choose to complete them for deeper understanding.

A list of suggested courses is found on Blackboard under the Content Area "General Information" > "ESRI Virtual Campus Course Codes to Get".

Special Accommodations: Students requiring specific accommodation please contact the UIC Disability Resource Center at: 1200 W. Harrison St. 1190 SSB (MC 321) or email: drc@uic.edu (312) 413-2183 Voice or (312) 413-0123 TTY or (312) 413-7781 FAX

Video Relay Service: Call 1-866-327-8877, when asked, provide the name of the person you are trying to contact and the videophone #312-413-0123. For more information about the DRC:
http://www.uic.edu/depts/oa/disability_resources/index.html

Some Reference Texts: This course does not require you to purchase a textbook, however, the references listed below were used as source material in developing this course and should be considered an essential part of your professional library if you are considering pursuing GIS in your career.

Brewer, Cynthia A. 2005. *Designing Better Maps – A Guide for GIS Users*, ESRI Press, Redlands, CA. ISBN: 1-58948-089-9.

Krygier, Wood. 2005. *Making Maps – A Visual Guide to Map Design for GIS*. The Guilford Press, New York. ISBN: 1-59385-200-2

Longley et al. 2011. *Geographic Information Systems & Science*, 3rd Edition. John Wiley & Sons. ISBN: 978-0-470-72144-5

Mitchell. 1999. *ESRI Guide to GIS Analysis – Geographic Patterns and Relationships*, Volume 1. ESRI Press, Redlands CA. ISBN: 1-879102-06-4

Mitchell. 2005. *ESRI Guide to GIS Analysis – Spatial Measurements and Statistics*, Volume 2. ESRI Press, Redlands, CA. ISBN: 1-589481-16-X

O'Looney. 2000. *Beyond Maps – GIS and Decision Making in Local Government*. ESRI Press, Redlands CA. ISBN: 1-879102-79-X.
Provides useful background in understanding uses of GIS by local government

Thomas and Ospina. 2004. *Measuring Up – The Business Case for GIS*. ESRI Press, Redlands CA. ISBN: 1-58948-088-0 Interesting examples of use of GIS....see pp25 and 26 for project created by course instructors!

Zeiler. 1999. *Modeling Our World – The ESRI Guide to Geodatabase Design*. ESRI Press, Redlands CA. ISBN: 1-879102-62-5

UPP 462 Class **Revised** Schedule Fall 2016

Cl	Date	Topic	Lecture/Exercise/Activity	Homework
1	26 Aug	Course Overview Review	<ul style="list-style-type: none"> • Review of Syllabus • Coordinate Systems • Review of GIS basic knowledge 	<ul style="list-style-type: none"> • Prepare a map of census tract data
2	30, 31 Aug	Creating Feature Classes & Features 1	<ul style="list-style-type: none"> • Creating & Editing Feature Classes and Features • Geodatabase 	<ul style="list-style-type: none"> • Bad Project Log Exercise and Editing
3	6, 7 Sept	Creating Feature Classes & Features 2	<ul style="list-style-type: none"> • More Geodatabase • Georeferencing maps • Spatial Join 	<ul style="list-style-type: none"> • Create a polygon feature class of voting precincts from a street centerline file and by georeferencing a map image.
4	13, 14 Sept	Network Analyst 1	<ul style="list-style-type: none"> • Create network dataset • Best route • Closest facility • Service area 	<ul style="list-style-type: none"> • Project #1 Assigned
5	20, 21 Sept	Network Analyst 2	<ul style="list-style-type: none"> • Walkability analysis • Additional Solvers 	<ul style="list-style-type: none"> • Keep working on Project #1 due Sept. 26 & 27
6	27, 28 Sept	Spatial Analyst 1	<ul style="list-style-type: none"> • Raster basics • Density & Interpolation 	<ul style="list-style-type: none"> • Using raster data for site selection
7	5, 11 Oct	Spatial Analyst 2 Model Builder 1	<ul style="list-style-type: none"> • Manual Site Selection model • Introduction to MB 	<ul style="list-style-type: none"> • Model builder ESRI training
8	18, 19 Oct	Model Builder2	<ul style="list-style-type: none"> • Automated Site Selection model • With iterators • What is a good class exercise 	<ul style="list-style-type: none"> • Work on Special Topics Project Cont.
9	25, 26 Oct	Project 2 Special Topics Presentations		
10	1, 2 Nov	ArcGIS Online	<ul style="list-style-type: none"> • Making webmaps • Online map design 	<ul style="list-style-type: none"> • Make a Web application
11	8, 9 Nov	Spatial Statistics I	<ul style="list-style-type: none"> • Descriptive statistics • Descriptive spatial statistics 	<ul style="list-style-type: none"> • Final Project Proposal
12	15, 16 Nov	Spatial Statistics II	<ul style="list-style-type: none"> • Clustering 	<ul style="list-style-type: none"> • Flow chart and proposal revisions
	22, 23 Nov	Thanksgiving		
13	29, 30 Nov	Work on Project 3 in Class/catch up on materials need to review/Project 3 Presentations		
14	6, 7 Dec	Project 3 Presentations (finals week)		