New York University
Robert F. Wagner Graduate School of Public Service
URPL –GP 4649
Geographic Information Systems in Urban Planning II, FALL 2013
Mondays, October 28, November 4, 11, 18, 25, December 2, 9; 4:55pm-6:35pm
Computer Lab at the Waverly Building, Room 668.

3D Modeling allows planners to visualize the impact of new buildings on the landscape
Hurricane Katrina’s Path

COURSE SYLLABUS

Professor Zvia Segal Naphtali
Home/office phone 212-877-1475
zvia.naphtali@nyu.edu
Office Hours: Mondays 4:30pm or by appointment after class
For administrative matters
Craig Radford Schott
craig.schott@nyu.edu
212-998-7477

Course Prerequisites:
To register for this class, students must complete the URPL–GP 4648 Geographic Information Systems (GIS) in Urban Planning I course, or an Introduction to GIS course taken elsewhere or have some hands-on experience using GIS elsewhere.

Course Requirements and Grading
Students are required to complete a Final Project paper (50% of the grade for this class). This paper and attached maps are due on the last day of class (December 9). Details about the Final Project assignment and sample Final Projects from previous years will be available in class. A one page proposal for the Final Project must be handed in on the 5th day of class (Nov. 25). Students are also required to complete three homework assignments (30% of the grade) and a small reading report (20% of the grade) due on the last day of class -- December 9.

Details about these three homework assignments will be discussed on the first and second days of class, and will also be available in a separate document that will be distributed in class. Sample Final Projects from previous years will also be available on NYU Classes. Note that all assignments for this class must be completed on time.
Course Description

This intermediate level GIS course is designed to build upon and extend the knowledge and skills that students acquired in the first GIS class -- URPL–GP 4648 Geographic Information Systems in Urban Planning I -- or through their hands-on experience learning or using GIS elsewhere.

The work in this class will be much more challenging and advanced than the GIS I course. Students will learn to symbolize data in more sophisticated ways, learn new ways to annotate and label maps, and more. Students will also learn a number of new data management techniques for manipulating, querying and editing spatial data. They will learn to design professional map layouts and will be introduced to the uses of map templates in ArcGIS 10. Students will continue learning to critically inspect maps designed by others, to identify their purposes, and to evaluate their strengths and their weaknesses.

PART #1 LESSONS 1-3 Mapping Woodside, Queens

The first class -- October 28 – will start with a short exercise that will involve preparing a map with census data for the Borough of Queens. Next, students will be learn to prepare maps for the Woodside, Queens Case Study.

The first short class exercise will introduce students to mapping census data on the population living in Queens, NYC and in Woodside, Queens. Students will prepare two thematic maps of the population characteristics of people living in Queens. They will learn to use the ArcGIS Effects Toolbar to compare two maps of the population living in Queens in a very interesting way. These maps will be (1) a map of the African-Americans in Queens, and (2) a map of Asians living in Queens. Using the Swipe Tool (available on the Effects Toolbar), students will be able to peel the top layer back and see the layer underneath it.

The first three classes -- Oct. 28, Nov. 4 and Nov. 11 -- will focus on mapping data for a Case Study on Revitalizing Woodside, Queens. The Case Study is largely based on materials from a Wagner Capstone that was completed a number of years ago. One of the goals of the Capstone was to develop strategies to facilitate travel from Woodside to major employment centers. This Case Study was adapted by Prof. Naphtali for use in her GIS classes. Materials from this Capstone will be used to introduce Wagner students to the uses of GIS in the design of redevelopment and transportation plans.

In the second (and larger) part of the first day of class -- October 28 -- students will be preparing land use and zoning maps for the Woodside case study, a task that they will be asked to continue during the week after this first class. They will be using MapPLUTO files for 2004, 2007, 2010 and 2013. Their task will be to map changes in land use – manufacturing, commercial, residential and mixed use in Woodside over these years.
Students will also begin preparing Land Use maps using a number of fields including, for example, the “year built” (the age of various buildings), the number of buildings on a lot, and the number of floors. They will work with data for 2004, 2007, 2010 and 2013.

[Note that the 2013 MapPluto files have only recently become available free of charge on the NYC Dept. of City Planning website (allowing us to add 2013 MapPLUTO data to this Case Study). See http://www.nyc.gov/html/dcp/html/bytes/appbyte.shtml]

Working on the Woodside case study students will also learn about the uses of GIS in mapping transportation. They will be adding subways and railroads that cross Woodside to their maps.

In the **second** class – **November 4** -- students will start preparing population, economics, and housing maps using Census Block Groups and Census Block data for Woodside. The data will be from the censuses of 1990, 2000 and 2010. They will learn to prepare a variety of maps for these three decades of Census Data. They will be mapping data on race and ethnicity, economics, housing patterns, transportation, and other characteristics of the people living in Woodside. Note that while completing the exercises for this case study, students will develop mapping skills and ways of thinking that can be usefully applied to GIS projects other than this particular one.

**GUEST PRESENTATION:** (Tentative). There will be a brief Presentation by C. Chang. He will present highlights of the work he completed for his recent Ph.D. dissertation at the CUNY Graduate Center. Dr. Chang will demonstrate the uses of three decades of Census Maps in his study of the process of gentrification in Park Slope, Brooklyn.

In the **third** class -- **November 11**— students will be introduced to some more advanced applications of ArcMap. They will first learn to create new features in ArcMap, using the *feature creation Tool Set*. In this hands-on class exercise students will be introduced to the variety of the editing tools available in ArcMap. These tools will enable them to draw the boundary of the Woodside Study Area. They will be using a paper map to guide them in tracing the polygon for Woodside. They may learn to use the “new map” to “Clip” the tax lots in the Study Area from a larger map of Queens.

In this **third** class, students will also be introduced to **3D Analyst** extension of ArcMap. They will learn to create three-dimensional displays with ArcScene. **3D Analyst** is used by City Planners and developers to simulate scenarios as well as to assess and analyze the impacts of real-world projects on neighborhoods.

**A HANDS-ON TUTORIAL** by Himanshu Mistry. In this tutorial, students will be introduced to ArcScene -- a 3D visualization application. Mr. Mistry will be using the building footprints data to show the number of buildings on a lot Woodside.
The data for the building footprints was downloaded originally from the DoITT website and is now available at this website https://nycopendata.socrata.com/browse?utf8=%E2%9C%93&page=2.

As part of their first homework, after this third class, students will also be asked to complete (and take notes) a few chapters in the required book *Getting to Know ArcGIS*. These will include chapters 12 & 13 on “Creating Features,” and on “Editing Features and Attributes. Students should also complete Exercise 7a on “Creating Custom Symbology” pp. 208-217 and 7b, “Symbolizing Features by Categorical Attributes,” pp. 218-228.

**IMPORTANT NOTE:** Preparing for the fifth class on Nov. 25, students should also start working on Exercise 7d on “Symbolizing Rasters.” This topic will be central to the work in PART #3 of this class.

**HOMEWORK #1: Due on the 4th day of class -- November 18.**

This first homework is designed to review and reinforce what students learned in the first three classes which involved the preparation of maps that compare and contrast various land use changes from 2004 to 2008, 2010 to 2013. In this first Homework, students will also be asked to prepare maps using some data fields in the Census 1990, 2000 and 2010. They will be asked to map fields such as median income, the characteristics of the housing in the Woodside Study Area and the area surrounding it and more. Students will be asked to prepare **at least five maps** (not including the maps they worked on in class).

**NOTE #1:** All maps (prepared during class or as homework assignments), must be saved as Map Packages (mpks), and as pdfs. The pdfs should be embedded in a Word document that discusses the maps. The pdfs should also be brought into a PowerPoint. In their Word document (at least 3-4 pages long), students should discuss the challenges they faced completing this work, and what they learned completing the homework assignment. The Map Packages (mpks), all the data, the pdfs, the PowerPoint and the Word documents (with embedded maps) **must be saved on both the students’ USBs.** Note that one of the USBs will be collected by Professor Naphtali at the end of the 4th class. **NOTE #2:** All the maps and the written comments **should also be printed in color** and placed in the students’ class folders.

**NOTE #2:** Students should also turn in with **HOMEWORK #1** all the work they completed during class and ALSO some of the work they completed from chapters in the book *Getting to Know ArcGIS*. Samples will be available in class.
The **fourth** day of class, **November 18**, will focus on some more advanced techniques in Geocoding in ArcMap. The class will start with a geocoding exercise that involves some addresses of properties that were involved in the New York City’s Third Party Transfer Program. This Program has taken neglected buildings from negligent owners and has given them to new responsible owners. Several years ago the Association for Neighborhood and Housing Development (ANHD) hired Prof. Naphtali to help them geocode the addresses of a number of these buildings. For some background on this program, please go to [http://www.anhd.org/catch-all/developing-and-preserving-affordable-housing;](http://www.anhd.org/catch-all/developing-and-preserving-affordable-housing;) [http://www.chpcny.org/wp-content/uploads/2011/02/final-report1.pdf;](http://www.chpcny.org/wp-content/uploads/2011/02/final-report1.pdf;) see also some more details on Third Party Transfer Program in [http://prtldrprdwweb.nyc.gov/html/hpd/downloads/pdf/third-party-process.pdf.](http://prtldrprdwweb.nyc.gov/html/hpd/downloads/pdf/third-party-process.pdf)

The first step in geocoding the addresses will involve students in editing the Excel file in which these addresses of the properties were made available. Next, students will learn to bring the edited Excel file into ArcMap. The class exercise will next take the students through some of the basic geocoding steps: They will learn (1) to create an address locator; to (2) to use the address locator to geocode the addresses in the table, and (3) to re-match the unmatched addresses until they most of them appear on the map.

To reinforce what they learned in this geocoding exercise, students may also start working on a second exercise that involves crime data -- mapping shooting incidents in NYC.

**HOMEWORK #2:**  
**Due on November 25.**

**HW #2.1:** Students will be continue (and complete) the work of geocoding the addresses of the buildings that were involved in Third Party Transfer Program. They will also be asked to prepare a professional report to the client – The Association for Neighborhood and Housing Development. In **HW #2.2** Students will be asked to complete the geocoding of the shooting incidents in NYC. In **HW #2.3** students will be asked to complete all the work in Ch. 14 on “Geocoding Addresses” in the required book for this class, *Getting to Know ArcGIS* (pp. 457-487).

**PART #3  MAPPING HURRICANE KATRINA  Nov. 25, Dec. 2 & 9**

In the third part of this class, students will begin learning to prepare maps of the coastal flooding from the Hurricane Katrina storm surge and to calculate the damage to the land and the people caused by this hurricane. Students will be introduced to a number of more advanced techniques and applications in GIS.

Note that these exercises will be continued in the Spring of 2014 Advanced GIS class.
The **fifth** and **sixth** days of class, **Nov. 25**, and part of the **Dec. 2** class, will be devoted to learning to map **raster and terrain data**. Students will be working with a basemap of the Mississippi Coast elevation and will start to learn how to symbolize **raster data** in ArcGIS. Time permitting, they may be briefly introduced to creating a time series map showing Katrina’s Path. Note that in preparation for this class, students should be completing the exercises in Chapter 20 in the required book *Getting to Know ArcGIS* on “Analyzing Raster Data” (see pp. 675- 708).

**December 2 -- A GUEST PRESENTATION:** David Kraiker, Geographer, Census Bureau, New York Regional Office; Tel: 212-584-3413. Mr. Kraiker will show the class how to download Census data for the three counties in Mississippi most affected by Hurricane Katrina – Hancock, Harrison and Jackson counties.

**HOMEWORK #3:** Due on the last day of class -- **Dec. 9.** The homework will involve continuing the class work on Hurricane Katrina. Note: Details will be available on **Nov. 25**.

In the beginning of the **Seventh and last class -- Dec. 9** -- students may continue to work briefly on the Hurricane Katrina Case Study. The second part of class will be devoted to at least three presentations of the Final Projects for this class, some Homework Assignments and a class discussion of the assigned reading. The class will end with a discussion of some of the advanced GIS techniques to be introduced in the Advanced GIS class in the Spring 2014.

Note that in this intermediate level GIS course, students will be introduced to a number of the many geoprocessing techniques that are available for spatial analysis in ArcMap 10. These geoprocessing techniques range from simple to complex queries, including selecting by attributes or by location, to using buffers, etc. Note also that in the **Advanced GIS** class in the Spring of 2014 students will learn to use the more advanced geoprocessing techniques including finding what’s nearby, union, intersect, spatial join, dissolve, merge, complex model building techniques, writing programs in Python and more. (Please consult chapters. 18-19 in the Ormsby, et. al., book *Getting to Know ArcGIS*, to learn about these geoprocessing techniques.) Consult also Chapter. 9 in *GIS for the Urban Environment*.

**SUGGESTED TOPICS FOR FINAL PROJECTS**  
50% of your grade.

Students may use data from the several of years of the MapPLUTO files, and from the Census data that will be available to them in this class. Alternatively, students can work on one of the projects described below. Note that data for some of the projects listed below can be obtained from Prof. Naphtali upon request.
SUGGESTED TOPICS FOR YOUR FINAL PROJECTS
Prepare five or more maps

(1) Students can prepare some national maps styled after those in the ESRI publication *Mapping Census 2010: The Geography of American Change* (on Reserve at Bobst Library).  

(2) Alternatively, students can prepare maps addressing urban planning and zoning issues in the **Hunts Point area** of the Bronx. For this project students can use data from the MapPLUTO files. They can add census maps, maps of the highways, subways and bus maps to explore this area of the Bronx. They can use the most recent MapPLUTO data (2013) for this Final Project is available for free on the NYC Dept. of City Planning website at  

See more on Hunts Point at the following websites

http://www.nycdec.com/project/hunts-point-peninsula

(3) Students can prepare maps for The Atlantic Yards Case Study (data is available upon request from Prof. Naphtali). This case study involves mapping land-use and census data for this in the area. Students can use several decades of MapPLUTO data, and Census 2000 and 2010 data on housing and population.

http://esd.ny.gov/Subsidiaries_Projects/AYP/AYAboutUs.html

(4) Students can work on the Community Gardens Project, a topic that keeps coming up in NYC politics. Data for this project is available from Prof. Naphtali.

(5) Another study can focus on the elderly in Queens, their access to Health Care and the Health Facilities available to them, and also on crime and the elderly in Queens.

(6) Students can prepare maps of traffic congestion in the South Bronx & address issues of Environmental Justice in the South Bronx; See the Final Reports on Wagner/ICIS.

(7) For other ideas for their final projects, students may also consult the book on reserve by Christian Harder, Tim Ormsby and Thomas Balstrom. *Understanding GIS: An ArcGIS Project Workbook* (ESRI Press, 2013) Note that some chapters from this book will be used in the Advanced GIS course, Spring 2014. See a description of book on the ESRI Press website.

http://esripress.esri.com/display/index.cfm?fuseaction=display&websiteID=238&moduleID=0

Note that FOUR copies of this excellent book are available on reserve at the Bobst Library. The book *Understanding GIS: An ArcGIS Project Workbook* is very valuable for learning GIS in that it allows students to assume the role of a GIS analyst challenged with finding the best location for a new park along the Los Angeles River in Southern California.
It is highly recommended that students in this GIS II class download **LESSON 1** the book *Understanding GIS: An ArcGIS Project Workbook* as a pdf from the ESRI Website (see below). The chapter – **LESSON 1** -- provides an excellent review of what students in this class learned about GIS so far in the GIS I and II classes. 


The data for this chapter can be made available to students in this class upon request. **Note also that all the chapters of this book are also available as videos at**

http://video.esri.com/series/60/understanding-gis-an-arcgis-project-workbook

### REQUIRED READING

• The assigned Chapters in the book by Ormsby, et. al., *Getting to Know ArcGIS* (ArcGIS 10.1), the 3rd Edition (ESRI Press, 2013). Students are also required to read and write comments on at least three recent articles available on ESRI’S ArcUser. Details will be discussed in class. See a recent article by Matt Sheehan of WebMapSolutions on “Improving Disaster Assessment: Disconnected mobile app uses ArcGIS Online”


### THE RECOMMENDED READING

• J. Maantay & J. Ziegler, *GIS for the Urban Environment*. Review Ch. 3. And the more advanced chapter 9. It is also recommended that students that students read THREE new Case Studies other than the ones they read for GIS I.

It is anticipated that by the end of this GIS II class students will have excellent working knowledge of spatial analysis, database design and management, and experience with a number of geoprocessing techniques. Students will gain more advanced mapping skills using ArcGIS 10 and should be prepared to take the Advanced GIS class in the Spring of 2014. Students will be able to apply the more advanced GIS skills, and the knowledge they acquired in this second GIS course, immediately in their current work, in their Capstone projects, and in their current and future public service professional careers.

### MORE RECOMMENDED READING

Please read the following article and take notes for your Review of Reading