

**GEOGRAPHY 484/684**  
**GIS for Urban Environments**  
**T, TH 12:30-1:50**  
**221 Crouse Hinds Hall**

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Office Hours: Tuesdays and Thursdays, 2:00-4:00 or by appointment

**Course Prerequisites:** Students should have prior GIS course experience before taking this class. If you have not taken GEO 383/683 or an equivalent course, please meet with me to determine whether this class is right for you at this time.

**Course Overview:** This course will build upon and extend the GIS skills you acquired in GEO 383/683 or equivalent. We will cover a selection of vector-based GIS methods and techniques that are currently available in ArcGIS 10.3 and that are commonly used by GIS practitioners/researchers working in urban planning and community development. You will be introduced to, and will become proficient with spatial data creation, download and management, map design, geodatabase design, advanced geocoding, ArcGIS online, the Network Analyst and Spatial Analyst extensions, and more. We will take a “review, reflect, replicate” approach to learning and implementing new GIS tools. First, we will review instructional documents describing how and when to use specific GIS tools and operations. Then, we will critically reflect on case studies found in the peer reviewed literature which describe how researchers have applied these tools to contemporary urban planning challenges. Finally, we will replicate the methodologies described in the case studies and GIS tutorials, learning how, when and why to perform operations. Our exploration of GIS tools will be within the context of four thematic areas: food access; urban housing; health and human service delivery; and crime analysis. Each of these topics is receiving much attention in contemporary society and GIS is proving to be an effective tool in understanding and addressing these (largely urban) challenges. For each of the four topics, you will solve problem sets that require conceptualizing solutions; finding, creating and organizing requisite data; performing appropriate spatial analyses; interpreting and reporting results; and reflecting on the approach, including the benefits and limitations of the GIS tools used.

**Course Objectives:** By the end of the course, you should have excellent working knowledge of GIS project management, spatial analysis techniques, and cartographic design. The course will provide you with the necessary skills and knowledge to use GIS in your research and professional careers. Specifically, at the completion of this course you will be able to:

- Conceptualize and critique proper GIS project design and implementation
- Find quality spatial data to support your GIS projects
- Manage spatial and non-spatial data using geodatabases and ArcGIS Online
- Document GIS data using metadata
- Share data using map packages and ArcGIS Online

- Use advanced geospatial tools and spatial extensions
- Apply advanced cartographic techniques to design professional maps
- Develop a GIS project portfolio

**Readings:** All readings listed as “class discussion readings” must be completed prior to the 4 class discussion days. If you haven’t read, you will not be prepared to participate in reflection discussions, which will affect your final grade (see Grading). Other readings are provided for your information and include a mix of GIS tutorials, journal articles and book chapters. “Additional readings” will help you complete your assignments and develop your final project. There are two recommended texts for the course (see below). Both texts are available from the ESRI Press and Amazon. All class readings are posted on blackboard.

### Recommended Texts

Mitchell, Andy. 2005. *The ESRI Guide to GIS Analysis Volume 2: Spatial Measurements & Statistics*. Redlands, CA: ESRI Press.

Available from ESRI Press (\$34.95)

Mitchell, Andy. 2012. *The ESRI Guide to GIS Analysis Volume 3: Modeling, Suitability, Movement, and Interaction*. Redlands, CA: ESRI Press.

Available from ESRI Press (\$44.95)

**Attendance:** Class attendance is required and is factored into your final grade (see Grading). Attendance will be taken at the beginning of each class. If you are not present when attendance is taken, you will be considered absent; no matter what time you arrive.

**Assignments:** There are 5 GIS assignments for this class. The first assignment is geared at providing a refresher to everyone on some GIS fundamentals. In addition, you will be expected to complete 4 project assignments – one for each of the four topical areas covered during the course. You are permitted to ask each other for assistance in completing the GIS project assignments but each of you must turn in your own GIS datasets, maps, and analysis. Assignment guides will be distributed in class and posted to blackboard. Ten points will be deducted each day that a GIS assignment is late unless you have a legitimate medical excuse.

There are also 4 critical reading reflection assignments that are due in class the day of our class reading discussions. The purpose of these assignments is to expose you to how others use GIS in their research and to prepare you for our in-class discussions. The assignment guide for reading discussions will be distributed in class and posted to blackboard. No late assignments will be accepted unless you have a legitimate medical excuse.

**Class Participation:** Class participation factors into your final grade. During reading discussion days, it is expected that you come to class prepared to engage in class discussion.

**Grading:** Your grade for this course will be based on a 500-point scale. Points are earned from assignments, the final project maps and report, the final presentation, class participation, and class attendance.

Component	Total Points	% of Course Grade	Details
GIS Assignments	200	40%	There are 5 GIS assignments worth 40 points each. Assignment sheets will be distributed in class along with the grading rubric.
Critical Reflection Writing Assignments	100	20%	There are 4 written assignments due in class on class discussion days. Each assignment is worth 25 points. Assignment sheets will be distributed in class along with the grading rubric.
Final Project Maps and Report	100	20%	Assignment sheet will be distributed in class. Grades will be based on project concept, design and execution.
Final Project Presentation	50	10%	Assignment sheet will be distributed in class. Grades will be based upon explanation of data, analysis and findings.
Class Attendance	30	6%	Attendance is integral to your success in this class. One (1) point is earned for attending each of 28 classes. Two (2) bonus points for perfect attendance.
Class Participation	20	4%	Up to five (5) points can be earned for actively participating in each critical reflection class discussion.

Final grades will be assigned on the following basis:

465-500	A	385-399	C+
450-464	A-	365-384	C
435-449	B+	350-364	C-
415-434	B	300-349	D
400-414	B-	<299	F

**Statement on Academic Integrity:** “Syracuse University’s academic integrity policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The university policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in

class activities. The policy also prohibits students from submitting the same written work in more than one class without receiving written authorization in advance from both instructors. The presumptive penalty for a first instance of academic dishonesty by an undergraduate student is course failure, accompanied by a transcript notation indicating that the failure resulted from a violation of academic integrity policy. The presumptive penalty for a first instance of academic dishonesty by a graduate student is suspension or expulsion. SU students are required to read an online summary of the university's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. For more information and the complete policy, see <http://academicintegrity.syr.edu>." Source: <http://academicintegrity.syr.edu/2011/07/suggested-syllabus-language/>.

**Statement on Disability:** If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), <http://disabilityservices.syr.edu>, located in Room 309 of 804 University Avenue, or call (315) 443-4498 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. Source: <http://universitysenate.syr.edu/curricula/disability-syllabus-statement.html>.

**Religious Observances Policy:** Syracuse University's new Religious Observances Policy asks instructors "to make appropriate accommodation for students' observance needs by providing an opportunity to make up any examination, study, or work requirement that is missed because of an absence due to a religious observance, provided the instructor has been notified no later than the end of the second week of classes." Source: ([http://supolicies.syr.edu/emp\\_ben/religious\\_observance.htm](http://supolicies.syr.edu/emp_ben/religious_observance.htm)). Please let me know by Tuesday, January 26 in person or by email if you expect to miss class because of your spiritual and religious practices so that we can adjust as necessary. You will be responsible for any material missed and for making up any missed assignments, obtaining any materials distributed in class during your absence, and getting notes from a classmate.

**Cell Phones and Other Communication Technology:** Please turn your phones off or to silent while in class and while working in the ISD Lab. There is no talking on the phone in the lab at all times, even when you're working outside of class on assignments. It's distracting and disruptive to others. Please take your calls outside the lab but remember to be courteous in the hallways outside of offices too.

**Computer Use:** Please refrain from using the lab computers for any non-course related activities during class lectures, discussions and in-class work time. It's distracting and disruptive to others. Students using ISD lab computers for lab-based courses have preference. Printers are not to be used for personal printing.

**Eating and Drinking in the Lab:** Please refrain from eating in the lab at all times. You may drink in the lab from closed containers (e.g. covered coffee mug, water bottle).

**Statement on add/drop policy:** It is the policy of the Geography Department that students must obtain FIRST the signature of the instructor and THEN the signature of the department chair if they wish to drop or withdraw from this course.

**Class Schedule:**

Class Date	Topic	Techniques	Final Project
T, 1/19	Introductions, Syllabus Review, Lab and Folder Access, GIS Skills Survey		Describe Final Project Concept
TH, 1/21 T, 1/26 TH, 1/28  T, 2/2 TH, 2/4	GIS Fundamentals  <i>Assignment 1 Distributed at the Beginning of Class</i>  <i>Assignment 1 Due at the End of Class</i>	GIS Data Sources, Data Management, Geodatabases, Metadata, Map Projection, Map Packages, Cartographic Design	Circulate Final Project Assignment Guide (T, 2/2)
T, 2/9	Analyzing Urban Housing Patterns with GIS - Critical Literature Discussion		
TH, 2/11 T, 2/16 TH, 2/18 (No Class)  T, 2/23	<i>Assignment 2 Distributed at the Beginning of Class</i>  Analyzing Urban Housing Patterns with GIS  <i>Assignment 2 Due at the End of Class</i>	Census, ACS and USPS Data, Mean Center, Directional Distribution, Scatterplots, Spatial Joins	Begin Thinking About Final Project Ideas, Schedule Brainstorming Meetings If Necessary
TH, 2/25	Health and Human Service Delivery Using GIS - Critical Literature Discussion		
T, 3/1 TH, 3/3 T, 3/8  TH, 3/10	<i>Assignment 3 Distributed at the Beginning of Class</i>  Health and Human Service Delivery Using GIS  <i>Assignment 3 Due at the End of Class</i>	Advanced Geocoding, Calculate Centroid, Euclidean Distance Network Analyst (Closest Facility, Service Area), Spatial Joins, MAUP	Final Project Proposal Due T, 3/8
T, 3/15 TH, 3/17	Spring Break, No Class		
T, 3/22	GIS and the Contemporary Food Justice Movement - Critical Literature Discussion		
TH, 3/24 T, 3/29 TH, 3/31	<i>Assignment 4 Distributed at the Beginning of Class</i>	Network Analyst (Service Area, Route), Google Maps	Final Project Data Acquisition and Analysis

T, 4/5	GIS and the Contemporary Food Justice Movement  <i>Assignment 4 Due at the End of Class</i>		
TH, 4/7	Analyzing Crime with GIS - Critical Literature Discussion		
T, 4/12 TH, 4/14 T, 4/19  TH, 4/21	<i>Assignment 5 Distributed at the Beginning of Class</i>  Analyzing Crime with GIS  <i>Assignment 5 Due at the End of Class</i>	Advanced Geocoding, Collect Events, Kernel Density, Mapping Clusters and Hot Spots	Final Project Analysis, Results Write-Up, Prepare Presentations
T, 4/26	Project Presentations		
TH, 4/28	Project Presentations		
T, 5/3	Course Reflection and Evaluation <i>Final Project Due at the End of Class</i>		

*Class schedule subject to change.*

## **GIS Fundamentals (1/21 – 2/4)**

### *Geodatabases*

ESRI. "What is a geodatabase?" <http://desktop.arcgis.com/en/desktop/latest/manage-data/geodatabases/what-is-a-geodatabase.htm> (accessed January 4, 2016).

### *Map Design*

Brewer, Cynthia A. *Designing better maps: a guide for GIS users*. Redlands, CA: ESRI Press, 2005. Read pp 1-37.

Buckley, Aileen and Kenneth Field. "Making a Meaningful Map." Fall 2011. ArcUser News. <http://www.esri.com/news/arcuser/0911/making-a-map-meaningful.html> (accessed January 4, 2016).

Maantay, Juliana and John Ziegler. *GIS for the urban environment*. Redlands, CA: ESRI Press, 2006. Read pp 125-149.

### *ArcGIS Online*

ESRI. ArcGIS Resource Center. "ArcGIS Online Help." [http://resources.arcgis.com/en/help/arcgisonline/index.html#/Welcome\\_to\\_ArcGIS\\_com\\_Help/010q00000002000000/](http://resources.arcgis.com/en/help/arcgisonline/index.html#/Welcome_to_ArcGIS_com_Help/010q00000002000000/) (accessed January 4, 2016).

### *Map Projections and Coordinate Systems*

Projections and Coordinate Systems Tutorial (See Word doc on blackboard)

New York State GIS Help Desk. June 30, 2003. "Define a projection using ArcCatalog." <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2003-06-30-0915&.pdf> (accessed January 4, 2016).

ESRI Knowledge Base - Technical Articles. January 11, 2016. "FAQ: Projection basics: What the GIS professional needs to know". <http://support.esri.com/ja/knowledgebase/techarticles/detail/23025>. (accessed January 12, 2015).

### *Spatial Data Sources*

Spatial Data Sources (See list of sources on blackboard)

### *Map Package*

ESRI. ArcGIS for Desktop. "Creating a map package." <http://desktop.arcgis.com/en/desktop/latest/map/working-with-arcmap/creating-a-map-package.htm> (accessed January 12, 2016).

### *Metadata*

ESRI. ArcGIS for Desktop. "What is metadata?" <http://desktop.arcgis.com/en/desktop/latest/manage-data/metadata/what-is-metadata.htm>. (accessed January 4, 2016).

### *Student Project Ideas*

Kingsley, G. Thomas, Claudia J. Coulton, Michael Barndt, David S. Sawicki, and Peter Tatian. 1997. *Mapping Your Community: Using Geographic Information to Strengthen Community Initiatives*. Washington, D.C.: U.S. Dept. of Housing and Urban Development.

Kirschenbaum, Josh and Lisa Russ. 2002. *Community Mapping: Using Geographic Data for Neighborhood Revitalization*. Oakland: PolicyLink National Office.

O'Looney, John. 2000. *Beyond Maps: GIS and Decision Making in Local Government*. Redlands, CA: ESRI.

Steinberg, Steven J. 2006. *GIS: Geographic Information Systems for the Social Sciences: Investigating Space and Place*. Thousand Oaks, CA: SAGE Publications.

### **Analyzing Urban Housing Patterns with GIS (2/9)**

#### ***Class Discussion Readings***

Hillier, Amy E., Culhane, Dennis P., Smith, Tony E. & Tomlin, C. Dana. 2003. Predicting Housing Abandonment with the Philadelphia Neighborhood Information System. *Journal of Urban Affairs*. 25(1): 91-105.

Silverman, Robert Mark, Yin, LI & Patterson, Kelly L. 2013. Dawn of the Dead City: An Exploratory Analysis of Vacant Addresses in Buffalo, NY 2008-2010. *Journal of Urban Affairs*. 35(2): 131-152.

#### ***Additional Readings***

MacDonald, Heather and Alan Peters. 2011. *Urban Policy and the Census*. Redlands, CA: ESRI Press. Read pp 1-32.

Mitchell, Andy. 2005. Chapter 2: Measuring geographic distributions. In *The ESRI Guide to GIS Analysis, Volume 2: Spatial Measurements and Statistics*. Redlands, CA: ESRI Press.

Oberle, Patrick, Frasier, Andrew, Sonnenschein, Jonathan & Stein, Levi. 2013. "Demolitions, Vacancy and Housing in Syracuse, NY". Syracuse, NY: Syracuse Community Geography. Available at <http://communitygeography.org/projects/housing-demolition-vacancy-and-tenure-patterns-in-syracuse-ny/>. (accessed January 4, 2016).



## Using GIS for Health and Human Service Delivery (2/25)

### *Class Discussion Readings*

Apparicio, Philippe, Mohamed Abdelmajid, Mylene Riva, and Richard Shearmur. 2008. Comparing alternative approaches to measuring the geographical accessibility of urban health services: distance types and aggregation-error issues. *International Journal of Health Geographics*. 7:7.

Schuurman, Nadine, Robert S. Fiedler, Stefan C.W. Grzybowski and Darrin Grund. 2006. Defining rational hospital catchments for non-urban areas based on travel-time. *International Journal of Health Geographics*. 5:45.

### *Additional Readings*

ESRI Resource Center. "What is geocoding?" <http://pro.arcgis.com/en/pro-app/help/data/geocoding/what-is-geocoding-.htm> (accessed January 4, 2016).

McLafferty, Sara L. GIS and Health Care. *Annual Review of Public Health*. 2003, 24:25-42.

New York State GIS Clearinghouse. September 14, 2015. "Adding the statewide geocoding web service to ArcGIS." [http://gis.ny.gov/gisdata/supportfiles/ds\\_1278-Geocoding-Web-Service.pdf](http://gis.ny.gov/gisdata/supportfiles/ds_1278-Geocoding-Web-Service.pdf). (accessed January 4, 2016).

New York State GIS Help Desk. June 7, 2013. "Best methods for geocoding in 10.1." <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2013-06-07-4221&.pdf> (accessed January 4, 2016).

New York State GIS Help Desk. September 14, 2005. "Set up cost field in network dataset to enable driving directions (ALIS)." <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2005-09-14-2031&.pdf> (accessed January 4, 2016).

New York State GIS Help Desk. September 23, 2005. "Definition of TF\_Cost and FT\_Cost (cost) fields in ALIS roads data." <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2005-09-23-2040&.pdf> (accessed January 4, 2016).

New York State GIS Help Desk. February 19, 2007. "Build a network using NYS Streets (ALIS) data." <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2007-02-19-2721&.pdf> (accessed January 4, 2016).

New York State GIS Help Desk. September 25, 2006. "Build service area in Network Analyst." <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2006-09-25-2512&.pdf> (accessed January 4, 2016).

New York State GIS Help Desk. February 19, 2007. "Create routes between one facility and multiple incidents, Network Analyst" <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2007-02-19-2724&.pdf> (accessed January 4, 2016).

New York State GIS Help Desk. February 19, 2007. "Setup network COST fields for drive-time and distance NYS Streets (ALIS)" <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2007-02-19-2726&.pdf> (accessed January 4, 2016).

New York State GIS Help Desk. August 20, 2009. "Network Analyst drive time analysis" <http://helpdesk.gis.ny.gov/documents/ticket.cfm?ticket=2009-08-20-3553&.pdf> (accessed January 4, 2016).

## **GIS and the Contemporary Food Justice Movement (3/22)**

### ***Class Discussion Readings***

McEntee, Jesse and Julian Agyeman. "Towards the Development of a GIS Method for Identifying Rural Food Deserts: Geographic Access in Vermont, USA." *Applied Geography* 2010 30: 165-176.

Widener, M., Metcalf, S., & Bar-Yam, Y. (2012). Developing a Mobile Produce Distribution System for Low-Income Urban Residents in Food Deserts. *Journal of Urban Health*, 89(5), 733-745.

### ***Additional Readings***

Leete, Laura, Neil Bania, and Andrea Sparks-Ibanga. "Congruence and Coverage Alternative Approaches to Identifying Urban Food Deserts and Food Hinterlands." *Journal of Planning Education and Research* 2012 32: 204-217.

Mitchell, Andy. "Finding suitable locations." In *The ESRI guide to GIS. Volume 3: modeling suitability, movement, and interaction*. Redlands, CA: ESRI Press, 2012. 31-84.

Mitchell, Andy. "Rating suitable locations." In *The ESRI guide to GIS. Volume 3: modeling suitability, movement, and interaction*. Redlands, CA: ESRI Press, 2012. 85-167.

Mitchell, Andy. "Modeling interaction." In *The ESRI guide to GIS. Volume 3: modeling suitability, movement, and interaction*. Redlands, CA: ESRI Press, 2012. 325-404.

## **Crime Analysis with GIS (4/7)**

### ***Class Discussion Readings***

Chainey, Spencer, Tompson, Lisa, and Uhlig, Sebastian. The utility of hotspot mapping for predicting spatial patterns of crime. *Security Journal*. 2008, 21:4-28.

Kuo, Pei-Fen, Lord, Dominique, and Walden, Troy Duane. Using geographical information systems to organize police patrol routes effectively by grouping hotspots of crash and crime data. *Journal of Transport Geography*. 2013, 30:138-148.

### ***Additional Readings***

Chainey, Spencer. *Spatial significance hotspot mapping using the Gi\* statistic*. Presented at the 21<sup>st</sup> annual problem-oriented policing conference by the Center for Problem Oriented Policing, September 2010.

Eck, John E., Spencer Chainey, James G. Cameron, Michael Leitner, and Ronald E. Wilson. *Mapping crime: understanding hot spots*. Washington, D.C.: U.S. Dept. of Justice, Office of Justice Programs, National Institute of Justice, 2005.

Lane, G. W., & Sui, D. Z. (2010). Geographies of identity theft in the U.S.: Understanding spatial and demographic patterns, 2002-2006. *GeoJournal* 2010, 75(1): 43-55.

Levine, Ned. Crime Mapping and the Crimestat Program. *Geographical Analysis* 2006 38: 41-56.

ESRI ArcGIS Desktop Discussion Forums. December 16, 2008. "Moran's I vs. Getis-Ord General G." <http://forums.esri.com/Thread.asp?c=93&f=983&t=270745> (accessed January 4, 2016).

ESRI ArcGIS Resource Center. 2010. "Hot Spot Analysis- Part 1." <http://video.esri.com/watch/404/hot-spot-analysis- dash -part-1> (accessed January 4, 2016).

"Getis-Ord Gi\* Statistic" in *Summary of hotspot analysis parameters and results*. Presented at the New England Fishery Management Council Committee Meeting Discussion, Thursday May 16, 2013.

GIS Collective "Hot Spot Analysis: Getis-Ord GI\*." 2013. <http://giscollective.org/tutorials/gis-techniques/spatial-statistics/hot-spot-analysis/> (accessed January 4, 2016).

Goldsmith, Victor. *Analyzing Crime Patterns: Frontiers of Practice*. Thousand Oaks, CA: Sage Publications, 2000.

Gorr, Wilpen L., and Kristen Seamens Kurland. "Conducting hot spot analysis." In *GIS tutorial for crime analysis*. Redlands, CA: ESRI Press, 2012. 127-149.

Harries, Keith D. *Mapping Crime: Principle and Practice*. Washington, DC: U.S. Dept. of Justice, Office of Justice Programs, National Institute of Justice, Crime Mapping Research Center, 1999.