Urban Geographic Information Systems (Urban-GIS)

Fall 2018,
CRP 386-01352, CRP 386-01353, PA 388K-60795
School of Architecture,
The University of Texas at Austin

Lecture: Monday 2 to 3:30 pm,
Sutton 2.114
Lab: Tues. or Thurs. 6:00-9:00 pm,
West Mall Building Computer Lab Classroom #1, WMB 1.110

<table>
<thead>
<tr>
<th>Instructor: Dr. Junfeng Jiao</th>
<th>Lead TA: Stephen Zigmund</th>
<th>TA: Emily Brehob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Hour:</td>
<td>Help session:</td>
<td>Help session:</td>
</tr>
<tr>
<td>Mon.3:30-5:00 Sutton 3.112</td>
<td>Tue. 10:00-12:00, WMB 1.110</td>
<td>Wed. 2:30-4:30, WMB 1.110</td>
</tr>
<tr>
<td>Office Hour:</td>
<td>Office Hour:</td>
<td>Office Hour:</td>
</tr>
<tr>
<td>Mon. 9:00- 11:00 Sutton 3.114</td>
<td></td>
<td>Thurs. 2:30-4:30</td>
</tr>
</tbody>
</table>

jjiao@austin.utexas.edu      Stephen.zigmund@gmail.com       emilybrehob@utexas.edu

When send class related email the Instructor, please make sure cc both TAs.

Required textbook:

Getting to Know ArcGIS for Desktop will be referred as the GTK in this class.

Required course materials: One flash drive (16 GB minimum) or cloud equivalent.
Recommended: External hard drive (160 GB minimum) or cloud equivalent.
Recommended articles: Listed at the syllabus schedule part

Course Description
Through lecture, labs, exercises, and a final project, this graduate course introduces students to GIS as a tool to be integrated into their research and work. The course gives an overview of GIS, shows how it is currently being used in professional and academic settings, goes through a myriad of applications associated with planning and policy, and looks at methods for critically evaluating data and geographic analysis outcomes. You will work through exercises covering data acquisition, spatial analysis, representation of spatial information, spatial statistics, 3D modeling, GPS data, and integrating GIS data with other programs. Beyond the technical, we will look at the social implications of GIS as a powerful tool for planning, policy, and decision-making including: technology access, data integrity, human error and bias, empowerment of underrepresented positions, and manipulation of information. Much of the focus of the course is on a final project, for which students can investigate a personal area of interest as it relates to GIS. Most recent studies and projects in Urban Information Lab and other leading urban GIS research units will be introduced to students as well.

You should be prepared for a course that is challenging in many (good) ways. You probably will spend many good hours doing GIS exercises and analysis, which is the only way to get a basic mastery of GIS. Exercises and assignments are set up to walk you through processes in a step by step manner, with the result being an understanding of how to use essential functions in GIS. The assignments are complemented by instruction within the lecture and the labs that explain the purpose, function, and potential applications of different GIS tools.

The class will include a traditional lecture format and group discussion. Lectures will look at GIS theory, methods, and applications, as well as cartographic representation. The group discussion will leverage your previous experiences, course material, and readings to discuss the relevance of GIS to your research and/or work. In all components of the course a critical evaluation of GIS outcomes, data use, and impacts will be encouraged and discussed.

Upon completion of the course, you will possess skills needed to begin using GIS in a professional or academic setting and an understanding of the opportunities and constraints of using GIS, how to critically evaluate GIS outcomes, and how to exhibit and display geographic findings.
Course Deliverables

1. Lab assignments
You have 7 lab assignments. These assignments are designed to take you through a variety of data and evaluation techniques in a GIS framework relevant to planning and policy. The assignments will be due at the beginning of lab period on the assigned dates. See Lab Schedule and Lab Instructions for details.

2. Lab exercises
You should complete the exercises in your textbook and save them to your external drive (or cloud equivalent) before your assigned lab period; see the Lab Schedule for due dates. At the beginning of lab, your TA will review your work and give you credit for completing the exercise. It is critical that you complete these, since they help you prepare for lab instruction and lab assignments.

3. Final project
For your final project, you will combine your personal interests and GIS skills acquired through the course to research a geographic question with planning and/or policy implications. Your project should include GIS techniques used as part of the class as well as a critical evaluation of your results and the results of equivalent work. We will devote several days in class to the project as well as numerous assignments. Start early thinking of ideas and gathering data. More information to come! Below you will see several deadlines associated with the final project.

For sample final projects, see https://soa.utexas.edu/programs/community-and-regional-planning/gis-education-resources/gis-showcase.

For some potential data sources see https://soa.utexas.edu/programs/community-and-regional-planning/gis-education-resources/gis-data.

4. Participation
You are expected to participate in the class through discussion and questions, reading and responding to correspondence, and additional small tasks as assigned.

Participation
Participation matters for your understanding and to facilitate an enjoyable class. A component of your grade will come from being engaged, showing a knowledge of course readings, facilitating class discuss, and showing a good attitude in class and in the lab. By far, the easiest way to do well in this class is to be an active participant, keep up with assignments, ask for assistance when you need to, and be present.

Technology in the Classroom
Technology is an important part of GIS and your university experience. Unfortunately, devices can also become distracting. To help everyone concentrate on the course material, laptops and tablets should only be out during lectures if they are being used for taking notes or accessing material directly relevant to the topic being discussed and you are actively participating in the class. All other devices should be put away and on silent.
Grading
Class Participation 5%
Lab assignments 35%
Lab exercises 10%
Final Project Report 25%
Final Project Presentation 5%
Final Project Draft Maps, Literature Review, Proposal, Outline, and Data Log 20%

ADDITIONAL INFORMATION

Students with Disabilities:

Qualified students with disabilities may request appropriate accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities at http://www.utexas.edu/diversity/ddce/ssd/ or 471-6259.

Academic Dishonesty/Plagiarism:

Students are expected to respect the LBJ School’s standards regarding academic dishonesty. You owe it to yourself, your fellow students, and the institution to maintain the highest standards of integrity and ethical behavior. A discussion of academic integrity, including definitions of plagiarism and unauthorized collaboration, as well as helpful information on citations, note taking, and paraphrasing, can be found at the Office of the Dean of Students web page (http://deanofstudents.utexas.edu/conduct/) and the Office of Graduate Studies (http://www.utexas.edu/ogs/ethics/transcripts/academic.html). The University has also established disciplinary procedures and penalty guidelines for academic dishonesty, especially Sec. 11.504 in Appendix C of the Institutional Rules on Student Services and Activities section in UT's General Information Catalog.

Emergency Evacuation Routes:

The following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, http://operations.utexas.edu/units/csas/terms.php:

a. Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
b. Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
c. Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class. In the event of an evacuation, follow the instruction of faculty or class instructors.
d. Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
e. Behavior Concerns Advice Line (BCAL): 512-232-5050
f. Link to information regarding emergency evacuation routes and emergency procedures can be found at: https://preparedness.utexas.edu/emergency-plans
Religious Holidays:

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Campus Safety and Wellness Resources:

More information on how to sign up for emergency text alerts, contact information for various UT offices, wellness resources, and campus initiatives relating to safety and/or wellness can be found at https://www.utexas.edu/campus-life/safety-and-security

**LECTURE SCHEDULE** *(subject to minor changes)*

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Class &amp; Techniques</th>
<th>Reading &amp; Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sep. 3</td>
<td><strong>No class</strong></td>
<td>Labor Day Holiday</td>
</tr>
</tbody>
</table>
  2. Color Brewer, [http://colorbrewer2.org/](http://colorbrewer2.org/) (use both of these resources to investigate colors and find color combinations that appeal to you) |
  2. GIS Analyses of Snow's Map, [https://www.udel.edu/johnmack/frec682/cholera/cholera2.html](https://www.udel.edu/johnmack/frec682/cholera/cholera2.html)  
  3. GTK ArcGIS Chapter 18.                                                                 |
  **Final Project Literature Review and Two Initial Project Ideas due by 5pm. Post to Canvas.** |
| Date  | Oct. 15 | Spatial Statistics & Final Project Discussion  
Techniques: geocoding, average nearest neighbor, and hot spot analysis  
**Guest Lecture: Dr. Bjorn Sletto**  
(UTSOA-CRP) | Environment and Planning B: Planning and Design 2013, volume 40, pages 1 – 2  
*Final Project Proposal and Preliminary Data Sources due by 5pm. Post to Canvas.*  
  
1. “What is Geocoding?” Arc GIS Desktop Help, beginning at:  
   [http://kirwaninstitute.osu.edu/?page_id=1578](http://kirwaninstitute.osu.edu/?page_id=1578)  
3. ESRI Spatial Statistical Video 1  
   [https://www.youtube.com/watch?v=X3NuuREUTvQ](https://www.youtube.com/watch?v=X3NuuREUTvQ)  
4. ESRI Spatial Statistical Video 2  
   [https://www.youtube.com/watch?v=3d_8nQpSCgE](https://www.youtube.com/watch?v=3d_8nQpSCgE)  
  
**Thurs., Oct. 18: Data Log for final project due by 6pm (bring to lab).** |
| Date  | Oct. 22 | Public Participatory GIS, Crowdsourcing, and Final Project Discussion (Cont.)  
Techniques: Crowdsourcing, PPGIS, big data  
**Guest Lecture: Dr. Bjorn Sletto**  
| Date  | Oct. 29 | Spatial Statistics (Continued) & Suitability Analysis  
<table>
<thead>
<tr>
<th>Date</th>
<th>Nov. 5</th>
<th>Event</th>
<th>Details</th>
</tr>
</thead>
</table>
| 10   | Nov. 5 | **Suitability Analysis (continued), Network Analysis and 3D GIS**
Outline for final project due by 5pm (post to Canvas). |
| 11   | Nov. 12| **Final Project Draft Map Review And Critique** | This will be a long class (approximately 3 hours), if you need to leave early you will need to notify me by Monday, Nov. 5. |
| 12   | Nov. 19| **Guest Lecture (Thanksgiving week)**
Guest Lecture: Dr. Ed Chow (Texas State—Geography) | Assignment #7 due at 1pm with upload to canvas and drop off a hard copy in color in my mailbox in Goldsmith Hall |
| 12   | Nov. 26| **Final Project Working Time** | Q&A for Final Project |
| 13   | Dec. 3 | **Final Project Presentations** | Presentation order TBD, presentation will continue into lab periods on Dec 4 and Dec 6. |
| 14   | Dec. 10| **Final Project Due (No Class)** | Final project due; upload to canvas and drop off one hard copy in color in my mailbox in Goldsmith Hall (note the office closes at 5pm). |
LAB SCHEDULE (subject to minor changes)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 4, 6</td>
<td>Introduction to the Computer Lab; Introduction to ArcGIS</td>
<td>Review GTK ArcGIS Chapters 1 and 2 before lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GTK #1: Work on GTK Exercise 3a, b, c, d; 4a, b, c; and 7a, b, c, d in lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Show completed GTK exercises to TA by the end of lab.</td>
</tr>
<tr>
<td>Sept 11, 13</td>
<td>Designing Maps: Symbolizing and Classifying Features</td>
<td>GTK #2: Complete GTK Exercise 8a, b, c; 9a, b, c, d; and 10a, b, c, d before lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Show completed GTK exercises to TA at beginning of lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Assignment #1: Map Design</td>
</tr>
<tr>
<td>Sept 18, 20</td>
<td>Projections</td>
<td>GTK #3: Complete GTK Exercise 6a, b, c before lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Show completed GTK exercises to TA at beginning of lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Assignment #1 due at the beginning of the lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Assignment #2: Projections</td>
</tr>
<tr>
<td>Sept 25, 27</td>
<td>Census Data and Attribute Data Management</td>
<td>GTK #4: Complete GTK Exercise 15a, b, c; 16a, b, c; and 17a, b before lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Show completed GTK exercises to TA at beginning of lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Assignment #2 due at the beginning of the lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Assignment #3: Analysis with Census data.</td>
</tr>
<tr>
<td>Oct 2, 4</td>
<td>Field Data and GPS Use</td>
<td>GTK #5: Complete GTK Exercise 12a, b and 13a, b, c before lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Show completed GTK exercises to TA at beginning of lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Assignment #3 due at the beginning of the lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Lab Assignment #4: Field Data and GPS Use.</td>
</tr>
<tr>
<td>Oct 9, 11</td>
<td>Finding, Evaluating, and Analyzing Final Project Data</td>
<td>Come to class having begun your data log for final project.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Assignment #4 due at the beginning of the lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continue Working on data log for final project</td>
</tr>
<tr>
<td>Oct 16, 18</td>
<td>Address Matching (Geocoding) and Spatial Statistics</td>
<td>GTK #6: Complete GTK Exercise 14a, b, c before lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Show completed GTK exercises to TA at beginning of lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Begin Assignment #5: Address matching (Geocoding)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data log for final project due at the beginning of lab.</td>
</tr>
</tbody>
</table>
Oct 23, 25 (Lab 8): **Spatial Statistics and Geographically Weighted Regression**
GTK #7: Complete geographic weighted regression assignment per TA instruction before lab.
* Show completed GTK exercises to TA at beginning of lab.
* Assignment #5 due at the beginning of the lab.
Begin Lab Assignment #6: Spatial Statistics

Oct 30, Nov 1 (Lab 9): **Geographic Weighted Regression and Opportunity Indices**
GTK #8: Complete GTK Exercise 11a, b, c and ArcGIS 10.0 Exercises available on Canvas before lab.
* Show all completed GTK exercises to TA at beginning of lab.
Continue working on Assignment #6.

Nov 6, 8 (Lab 10): **Suitability Analysis—Area Evaluation**
GTK #9: Complete Exercise 18a, b, c, d and 19a, b, c, d before class.
* Show completed GTK exercises to TA at beginning of lab.
* Assignment #6 due at the beginning of the lab.
Begin Lab Assignment #7: Suitability analysis, 3D modeling and network analysis.

Nov 13, 15 (Lab 11): **Suitability Analysis—Site Evaluation**
Watch the video, [http://www.youtube.com/watch?v=10yAQNiDzNU](http://www.youtube.com/watch?v=10yAQNiDzNU)
* Show completed GTK exercises to TA at beginning of lab.
Continue working on Assignment #7.

Nov. 20, 22: No lab; Thanksgiving Holiday

Nov 27, 29 (Lab 12): Work on Final Projects

Dec 4, 6 (Lab 13): Final Project Presentations (exact schedule TBD)
GENERAL LAB INSTRUCTIONS

1. All your assignments must be turned in as hard copies, stapled together, in color and/or black and white as specified in lab assignment at the beginning of lab and must ALSO be uploaded to canvas before lab begins as a SINGLE PDF per assignment.
2. You must save your data files in at least two locations; i.e. on your flash drive as well as, external hard drive, your hard drive, and/or a cloud drive. You cannot save your files permanently on the computer or server in the computer lab. All files will be deleted when you log out or at the end of the day.
3. The margins of your map layouts, when printed, should be at least .5” unless otherwise specified.
4. You must follow the memo format that will be uploaded to canvas.
5. You should spend some time in the computer lab early in the semester to familiarize yourself with printing procedures, to choose a computer that works well for you, and to navigate the network and different servers with ease. This will allow you to focus on your assignment during the lab period.
6. It’s a good idea to arrive a ½ hour early for lab, start your computer, and begin reviewing the next lab assignment. This way, you’ll be better prepared for the TA’s instructions.
7. You should *never* wait until the last minute to print your maps! The printer queue is likely to be long and you will not be able to turn in your assignment on time. You must turn in your assignment by the beginning of lab; this will help everyone concentrate and pay attention to the TA’s instructions. See the “due dates” section on page 2 of this syllabus. Remember to have enough funds in your Bevo Bucks account for printing.
8. If you work on your personal computer, be aware that TA support will only focus on issues associated with GIS. IT issues and computer capacity issues will need to be handled by you and/or other support staff. Please note: ArcGIS software can only be installed within a Windows operating system and past students have experienced difficulty with partitioning Mac hard drives to install and run ArcGIS.
9. The lab session is a professional working environment and all students are expected to follow UT rules of professional conduct. For further information see the Student Judicial Services Website: http://deanofstudents.utexas.edu/sjs.