



**SW 799 Section 001: Geographic Information Systems (GIS) for Social Workers [and Public Health Professionals]**

**Fall 2014**

**Mondays Sept 8, 15, 22, 29, Oct 6**

**5:00pm – 8:00pm**

**Angell Hall Classroom A**

**Larry M. Gant, PhD, LMSW**

**Office: 3780 SSW**

**Email: [Lmgant@umich.edu](mailto:Lmgant@umich.edu)**

*NOTE: \*\*\*PLEASE\*\*\* DO THE PRE-WORKSHOP LEARNING ON P. 5 OF THE SYLLABUS . THERE ARE THREE VIDEO MODULES THAT WILL HELP YOU QUITE A BIT IN INTRODUCING YOU TO THE CONCEPT AND APPLICATIONS OF GIS. ALSO, GO THROUGH THE WORKSHEETS AND TRY AS MANY AS POSSIBLE ON YOUR OWN (OR IN SMALL GROUPS) BEFORE THE GIS WORKSHOPS. BELIEVE ME, YOU WILL BENEFIT \*\*\*\*MUCH\*\*\*\* MORE FROM THE WORKSHOPS IF YOU DO SO.*

*IF YOU WISH, BEFORE CLASS BEGINS, CONSIDER DOWNLOADING QGIS ON YOUR OWN COMPUTER (IF YOU HAVE ONE) AND/OR CONSIDER REVIEWING ARCGIS AT [ARCGIS.COM](http://ARCGIS.COM).*

**1. Course Description:**

The goal of the GIS minicourse is to provide a general introduction to the use of GIS software for social work practice. Students will learn the basics of practical mapping of data and information using a range of GIS software. Students will learn the basic strategies of securing data, securing map images, and integration of maps and data to create single and multi-layered data maps. Students will be presented with real time applications of this mapped information in clinical and community practice. We will learn to use mapping functions of two<sup>1</sup> GIS applications: ArcGIS (web based) and QGIS (open source software for both MacOS and Windows). ArcGIS will be used as a backup; and historically the class has used ArcGIS. However, the current classroom configuration for the Fall 2014 term may make ArcGIS extremely impractical for use. [Candidly,

overreliance on ArcGIS sometimes limits generalizing of GIS-mapmaking skills, anyway!]

Hands on GIS courses are (in my experience) best learned with patience, practice, small group problem solving, willingness to engage in trial and error, a bit of neatness in file management, and a sense of humor. Although GIS programs are nice software applications, it's possible that systems crash, software hangs, and maps can literally "just disappear". In almost all cases, patiently starting over – especially during the learning process – is a wonderful remedy!

Generally, I'll begin each hour with a **very** brief lecturette (10 -20 minutes or so) followed by my demonstration of a technique/application, followed (with handouts) by all participants trying out the technique (trial and error happily encouraged!) until most participants are able to complete and move on! We'll end up with some closure consisting of review, troubleshooting, and Q/A.

The handouts- if followed properly – will enable you to complete a number of basic GIS tasks commonly requested in social work, public health, urban planning, and other social sciences.

## **2. Course Content:**

This course is intended to give students the ability to plan, design and execute a GIS project for human service areas. Students should learn the potentials and limitations of geographic analyses. They will learn how to build geographic databases, analyze data spatially and produce output that succinctly summarizes their results. Students will learn the differences, advantages and disadvantages of raster and vector systems for addressing different resources management projects. They will also learn where to acquire geographic data and the errors associated with using it. The teaching will revolve around four case studies that will allow the student to see what is entailed in developing a GIS project, and introduce the student to the resource management question. Examples of epidemiological applications will give students the opportunity to see and use this powerful tool. Some of the topics to be covered are data import/export, layering, table management, classification, labeling, spatial and attribute queries, buffering, and address geocoding.

## **3. Course Objectives:**

Upon completion of the course, students will be able to:

1. Describe the theory and practice behind the use of GIS.
2. Identify, create and import databases and information spreadsheets into a GIS (ArcGIS, QGIS)

3. Identify, create and import maps, pictures and images into a GIS (ArcGIS, QGIS)
4. Produce a variety of simple digital data maps using several basic GIS packages (ArcGIS, QGIS, Batchgeocode.com)
5. Define key concepts related to GIS and geographic data
6. Describe the strengths and limitations of GIS mapping applications.

#### **4. Course Design:**

The course will include minimal lecture (about 10 minutes/hour) and lots of hands-on worksheets and case studies supported by maps, images, and other multimedia (e.g., animations and simulations, web 2.0 resources). We'll engage in group discussions, hands-on experience with mapping and a number of geographic software packages, collaborative problem solving in small groups and experiential exercises related to course materials.

#### **5. Grading and Assignments**

The course is graded as satisfactory/unsatisfactory. **Students will complete and submit a simple GIS mapping project of their own interest. The project should be between 2-3 pages.** Projects are due by the end of the final class session (Oct 6<sup>th</sup> 2014). Students will have some time to complete projects during the minicourse sessions.

#### **6. Relationship of the Course to Four Curricular Themes:**

- *Multiculturalism and Diversity:* Students will develop the capacity to identify ways in which diverse identities {ability, age, class, color, culture, ethnicity, family structure, gender (including gender identity and gender expression) marital status, national origin, race, religion or spirituality, sex, and sexual orientation} and other forms of social stratification and disenfranchisement influence can be represented and described using mapping and GIS approaches.
- *Social Justice and Social Change:* Achieving equity in distribution of resources including community information is critically important for social workers. This course will provide students with the means to understand the importance, strengths and opportunity costs of the use of public participation GIS applications in promoting social justice, promoting social change, and challenging programs, policies and services that support structural inequities, social injustice and thwart progressive social change.
- *Promotion, Prevention, Treatment, and Rehabilitation:* Space, place and time dependent data and information have been used in other disciplines to monitor, assess and evaluate health and human service related programs, policies and services that lead to promotion, prevention, treatment and rehabilitation. Students will be exposed to research and case studies that have been and can be used to visualize, analyze and

evaluate a variety of human service related promotion, prevention, treatment, and rehabilitation activities.

- *Behavioral and Social Science Research*: GIS applications have demonstrated utility in the conduct of basic and applied behavioral and social science research. GIS can be used in developing research designs that assessing human service related practice, policy, and programs. This course will provide students with the capacity to understand and influence the role that GIS applications play in the creation, observation and evaluation of evidence based research in the human services.

## **6. Relationship of the Course to Social Work Ethics and Values:**

Ethical standards of social work practice (NASW Code of Ethics) will be used to review issues commonly confronted in the development and provision of policy, programs, and services addressing the provision of spatial education, equity mapping, spatial information, maps, and GIS software applications and technology. The ethical themes of autonomy, beneficence, fidelity and justice will be particularly emphasized and discussed.

**Course materials:** All handout materials are online.

Pre-Workshop Learning: View the Harvard University  
Overview: “What is GIS?”

**Before you come to class on September 8, 2014 please access and view this superb and strongly recommended overview of GIS** – a 3 part interactive online presentation from Harvard University. Each module is about 10 minutes in length. It can (and should) be viewed several times throughout the minicourse. Here’s the link; the tutorial can also be accessed (as well as data download) on the CTools site.

<http://hcl.harvard.edu/libraries/maps/gis/tutorials.html>

This overview comes with GIS exercises for use with ArcGIS (or with any GIS if you have some knowledge). You can view these exercises at home, or view them on campus. Please try the exercises yourself – if need be, we’ll briefly review the exercises in class. In particular, the buffering and clipping exercises in tutorial #3 are very useful for our work later in the minicourse.

The overview is very helpful without going through the exercises. If you have access to ArcGIS, all the better.

<p>Sept 8<sup>th</sup> 2014: Making Maps without knowing GIS</p> <p>Introduction to GIS</p> <p>Epi Info/Map, Types of Maps</p> <p>Mapping Census Data</p>	<ul style="list-style-type: none"> <li>✓ 5:00 – 5:30 pm <ul style="list-style-type: none"> <li>○ Introductions and outcomes of the minicourse</li> </ul> </li> <li>✓ 5:30 – 6:30 pm <ul style="list-style-type: none"> <li>○ Basic Approach to Mapping and using GIS - Learning by doing</li> </ul> </li> <li>✓ 6:30 – 7:00 pm <ul style="list-style-type: none"> <li>○ Theory behind what you just learned to do!</li> <li>○ Basic Map Types: Choropleth, Dot Density, Case-based, and Spot Maps</li> <li>○ What GIS is, and what ArcGIS does; type of data that is mapped in public health applications (case-based, GPS (x-y coordinate, surveillance data)</li> </ul> </li> <li>✓ 7:10 – 7:30 pm <ul style="list-style-type: none"> <li>○ Batchgeocoding – What it is, and how to do it: <ul style="list-style-type: none"> <li>○ Using online batchgeocode applications</li> <li>○ Using ArcGIS batchgeocode functions</li> </ul> </li> </ul> </li> <li>✓ 7:30 – 8:00pm <ul style="list-style-type: none"> <li>○ Other mapping applications: Open Source, Epi Info, BatchGeo</li> </ul> </li> </ul>
<p>Sept 15<sup>th</sup> 2014: Mapping your own data: Other online apps</p>	<ul style="list-style-type: none"> <li>✓ 5:00 -6:00 pm : <ul style="list-style-type: none"> <li>○ Making Choropleth, Dot Density, Case Based &amp; Spot Maps</li> </ul> </li> <li>✓ 6:00 – 7:30 pm: <ul style="list-style-type: none"> <li>○ Customizing Maps using Map Editor</li> <li>○ Saving and Publishing Maps</li> </ul> </li> <li>✓ 7:30 – 8:00 pm: <ul style="list-style-type: none"> <li>○ Creating and mapping your own data: 5 cardinal rules</li> </ul> </li> </ul>
<p>Sept 22<sup>nd</sup> 2014 : Mapping with ArcGIS; Troubleshooting data/mapping problems; project work</p>	<ul style="list-style-type: none"> <li>✓ 5:00 - 5:30 pm: Discussing possible projects for the workshop</li> <li>✓ 5:30 - 6:00 pm: Visualizing data: importing and joining database(s) in ArcGIS; Clipping data/Shapefiles in ArcGIS</li> <li>✓ 6:00 – 7:00 pm: Nicole presentation: Overview of ArcGIS and intermediate level searches within Factfinder (ACS ; set up of drop-in session at Map Library/Center</li> <li>✓ 7:00 – 8:00 pm: Shapefile Projections: How do it and why</li> </ul>

<p>Sept 29<sup>th</sup>: Georectifying images; class/individual project work</p>	<p>✓ 5:00 – 6:00 pm: Projections and geocoding in ArcGIS : a review                  ✓ 6:10 – 7:00 pm: X-Y Coordinates on the fly: finding, creating and mapping: Use of Open Source GIS Apps and GIS Viewers                  ✓ 7:10 – 8:00 pm: MapLab: Making your maps and working your projects</p>
<p>Oct 6<sup>th</sup> : Export Layers; Open Source Demos, Project work; Presentations</p>	<p>✓ 5:00 – 6:00 pm: Continuation of Open Source GIS Apps: Recommendations                  ✓ 6:00 – 8:00 pm: MapLab: Finishing up individual and class projects</p>

**Great Data Resource for SW 799 GIS Projects at University of Michigan:  
SAND (Spatial and Numeric Data Services)**

The University Library's Spatial and Numeric Data Services (SAND) provides assistance with spatial data, numeric data, and statistics for the University of Michigan community. SAND offers two labs, Central - located in 203 Clark Library of Hatcher Graduate Library, and North - located in the Spatial Analysis Lab (room 2207) of the Art and Architecture Building.

Specifically, SAND:

- Assists in locating and acquiring digital numeric and spatial data sets, especially social science data sets
- Collaborates with the Documents Center to provide a complete resource for locating Census data
- Provides access to a variety of spatial and statistical software, and assistance in data management and translation
- Assists in using geographic information systems (GIS) software and locating campus resources for more advanced assistance
- Provides course-related and library instruction on data related topics
- Acquires, stores, and provides access to digital spatial data sets on a secure server

SAND provides lab spaces with advanced computers and software to help students and researchers work with spatial and numeric data and access to data only available from within our labs. We are equipped with ArcGIS, ArcView, ERDAS, SAS, SPSS, StatTransfer, Stata, Adobe Creative Suite (Photoshop, Illustrator, InDesign, Dreamweaver), and more.

**So as not to overload SAND staff, we will set up some group meeting sessions with SAND between weeks 3-5 of the minicourse!!**

**Miscellaneous Map Links and Resources**  
**Sources for GIS Data: US (domestic) and Global (Links checked as of**  
**September 3, 2014)**

Other wonderful links for public health and public health social work GIS “one stop shopping” (for shapefiles, datasets, georeferenced and nongeoreferenced map layers and pictures) include:

<http://wwwn.cdc.gov/epiinfo/script/shapefiles.aspx>

There are many resources for global and country specific data. Here’s a good beginning resource set:

<http://library.stanford.edu/depts/gis/web.html#Foreign>

Asian and Pacific Rim (but mainly China):

<http://www.chinadatacenter.org/Data/FreeDataDownload.aspx>

Africa Data Portal:

<http://earlywarning.usgs.gov/fews/africa/index.php>

US Census International DataBase:

<http://www.census.gov/ipc/www/idb/>

<http://www-sul.stanford.edu/depts/gis/FindData.html>