

EPID 794 – Geographic Information Systems and Public Health Applications

Spring 2015
3 credit hours

Instructor:

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Office hours: By appointment or during office hours (TBD)

Class time: T/TH 1:15-2:30 in Discovery Computer Lab (4th Floor)

Course Description

This is an intermediate level course in the principles and application of GIS technologies in public health practice and research. The course is suited to both masters and doctoral level students in any discipline of public health, or from other disciplines such as sociology or geography.

Learning Outcomes

By the end of the course, the student will be able to:

1. Understand the basic principles and primary tools of GIS
2. Know the difference between vector and raster data, geographic and projected coordinate systems, types of spatial data (points, line, polygons), and shapefiles and geodatabases
3. Describe the different types of analyses GIS can facilitate in public health practice and research
4. Enter, edit, select, join, and query both spatial and non-spatial data in attribute tables
5. Create point and choropleth maps for display, including use of legends and scale markers
6. Perform exploratory spatial data analysis and basic modeling of geographic health data
7. Explain the uses of GIS in online platforms such as web-based atlases and ArcGIS Online
8. Design and perform an independent project utilizing GIS and spatial analysis skills learned

Required Textbooks/Readings/Software

1. GIS and Public Health. Ellen K. Cromley and Sara L. McLafferty.
2. GIS Tutorial for Health. Fifth Edition. Kristen S. Kurland and Wilpen L. Gorr.
3. ArcGIS (ESRI) will be used in most in-class laboratory exercises. Other open source software may be used on occasion.

The syllabus and additional readings will be posted on our class Blackboard site.

Course Requirements and Grading

Students will be evaluated based on written assignments (2), computer lab assignments (10), a midterm exam, class discussion/participation, and a final paper.

- Written assignments are worth 11% of the final grade.
- Computer lab assignments are worth 22% of the final grade. They will cover the applied concepts learned in lecture and through your readings. All lab assignments must be done individually.
- Class participation through attendance and discussion will count towards 11% of the final grade.

- A midterm examination, which will feature written questions and applied GIS skills, will count towards 22% of the final grade.
- The final paper/presentation will be used to assess the student's comprehension and synthesis of the material taught throughout the semester. The paper/presentation will be worth 33% of the final grade. The final paper will be based upon a project each student designs and implements during the course of the semester.

<i>Written Assignments</i>	<i>50 pts (25 pts. each)</i>
<i>10 In-Class Lab Assignments</i>	<i>100 pts (10 pts. each)</i>
<i>Mid-term Exam</i>	<i>100 pts</i>
<i>Class Participation</i>	<i>50 pts (Attendance and active participation)</i>
<u><i>Final Paper or Video Presentation</i></u>	<u><i>150 pts</i></u>
<i>Total: 450 pts</i>	

Class Web Site: Announcements or assignments to the class will be occasionally made via e-mail using the Blackboard system. It is the student's responsibility to keep his/her current e-mail address in Blackboard. Course materials and related information will be posted on the course website. The URL is : <https://blackboard.sc.edu>. Please make use of the web materials and report problems to the instructor. If posted examination or assignment scores are incorrect, you have 14 days from the date of posting to notify the instructor or the score stands.

Carolina Code of Conduct: It is the responsibility of every student at the University of South Carolina Columbia to adhere steadfastly to truthfulness and to avoid dishonesty, fraud, or deceit of any type in connection with any academic program. Any student who violates this Honor Code or who knowingly assists another to violate this Honor Code shall be subject to discipline.

The University of South Carolina has clearly articulated its values, expectations, and policies governing academic integrity. All students and faculty are expected to maintain the highest possible standards of academic integrity. Any student found responsible for having engaged in academic dishonesty will be subject to academic penalty and university disciplinary action. Violations include, but are not limited to, improper citation of sources, improper use of another person's work, cheating, and any other form of academic misrepresentation.

All assignments should be done individually, unless otherwise stated.

Students are responsible for attending all scheduled class sessions and participating in class discussion. Information may be presented in class that is not in reading assignments. Please do NOT disrupt class by arriving late or leaving early, using your cell phone, or consuming food during class. If you cannot attend class, you are still responsible for the material covered. Please get notes and distributed materials from a fellow student or from the class website.

Accommodations: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Office of Student Disability Services: 777-6142, TDD 777-6744, email sasds@mailbox.sc.edu, or stop by LeConte College Room 112A. All accommodations must be approved through the Office of Student Disability Services.

Format of Lecture and Lab

Lectures are every Tuesday at 1:15 PM, and focus on conceptual or methodologic aspects of public health practice and research using GIS. Labs (every Thursday at 1:15 PM) are a chance for students to reinforce what they learn in class. You will have the opportunity to review concepts, do practice problems, and ask questions. There will be some opportunities in the lab to work in small groups. Attendance at both lecture and lab is mandatory.

Written Assignments and Final Project

The written assignments are intended to help you prepare for your final project/presentation.

If you chose to write a manuscript for publication:

The 1st written assignment is to develop a 3 page proposal on your proposed research topic. This proposal should include a short background of the literature, your research question(s)/hypothesis, and a description of your proposed data sources. Your 2nd written assignment builds upon your first assignment. In your 2nd assignment, you will add a methods section and initial map (i.e., preliminary results) to your proposal. This section of your proposal should be between 3-5 pages. Your final project will “bring it all together” in a final report, in a report suitable for peer-reviewed publication (i.e., formatted with references, title page, etc... for a specific journal of your choosing). A word of advice – start keeping track of your references early 😊

You must identify your target journal and format your paper according to that journal’s guidelines. Please pay close attention to their guidelines on word limits, allowable number of tables and figures, reference style, and use of color figures. If you need assistance determining the best journal for your paper, I encourage you to use <http://www.biosemantics.org/jane/> to help you select the best journal for your work. I HIGHLY encourage all my students to submit their paper for publication at the end of the semester, after receiving feedback and making appropriate revision.

If you chose to do a Presi video project:

The 1st written assignment is to develop a 3 page outline of your presentation. The outline should include the major points/themes to be covered in your video, beginning with your purpose statement (in this project, the purpose is less about a novel research question, and more about a message to increase awareness or motivate the audience to action) and moving forward logically with evidence and additional analyses you’ve completed using maps. In your 2nd assignment, show me your first 10 slides of your Presi presentation – purpose should be clear in the first few slides. The final project will be a Presi video presentation, approximately 20-30 slides in length, that increases awareness about a particular health problem that can be spatially visualized/analyzed. In some cases, you will want to use your video presentation to motivate the audience to take a specific action – such as advocate for a piece of legislation or use natural resources in alternative ways. A word of advice – learn how to use Presi early and practice with various templates 😊

Week	Lecture Topic	Lab Topic	Readings	Assignments
1	1/13: Introduction to GIS for public health applications	1/15: ArcMap & ArcCatalog basics	Cromley Chapter 1 & 2 Chakraborty article (2011)	Tutorial for Health Chapter 1 & 2
2	1/20: Manipulating spatial data	1/22: Basic editing in ArcMap	Readings (Chapter 1 & 2) continued from Week 1 as needed Carlin article (2003)	Tutorial for Health Chapter 3
3	1/27: Visualizing point and area level health data	1/29: Choropleth maps	Cromley Chapters 3-4	Tutorial for Health Chapter 4
4	2/3: Sources of geographic data	2/5: Preparing and joining US Census data to maps	Readings (Chapters 3-4) continued from Week 3 as needed	Tutorial for Health Chapters 5 *Pick up lab tutorials 1-4 on 2/3
5	2/10: Project consultations/work	2/12: Geocoding addresses	TBD Roche article (2002)	Tutorial for Health Chapter 6
6	2/17: Automating ArcGIS analysis tasks (James Hibbert)	2/19: Processing and analyzing spatial data; using Modelbuilder	Cromley Chapter 5	Tutorial for Health Chapter 7-8 *Written assignment #1 due on 2/17
7	2/24: Exploratory spatial data analysis	2/26: Spatial autocorrelation, cluster and hot-spot analysis	Cromley Chapter 5 cont. Roche article (2002)	GIS Tutorial II Chapters 8-9
8	3/3: Environmental applications (Jim Burch)	3/5: Midterm Exam (Multiple choice questions and exercise using ArcGIS)	Cromley Chapter 6	Tutorial Catch up Week * Pick up tutorials 5-9 on 3/5
9	3/10: Spring Break	3/12: Spring Break	N/A	N/A

10	3/17: Factors associated with the spatial distribution of disease	3/19: Spatial Regression	Cromley Chapter 7	Written assignment #2 due on 3/17 ESRI Spatial Regression Tutorial
11	3/24: Access to health services	3/26: Mapping availability of services	Cromley Chapters 9 Guagliardo article (2004)	ESRI Network Analyst Tutorial
12	3/31: Location analytics	4/2: Location-allocation modeling of mobile flu clinics	Cromley Chapter 10	ESRI Location-Allocation Tutorial
13	4/7: Web-based atlases (Dr. Ben Schooley)	4/9: ESRI Web App Builder	TBD	Tutorial on Making a Web App from ArcGIS Online Content
14	4/14:	4/16:		
15	4/21: Final paper/video presentations	4/23: Final paper/video presentations	N/A	Final project due on 4/17 by noon Pick up tutorials on 4/21