

# *SCG 150, Introduction to Geographic Information Systems*

## *Syllabus –Fall II Term, 2013*

LaGuardia Community College, City University of New York  
Department of Natural Sciences, Environmental Science Program

**Credits:** 4, **Hours:** 6

**Class Schedule:**

Monday, Tuesday, Wednesday, and Thursday: 1:00 - 4:25 pm Location: C 238

**Instructor:** Holly Porter Morgan, Ph.D.

**Office Hours:** Tuesday and Thursday 11:00 am – 12:30 pm and by appointment.

**Office:** M221D

**Phone:** (718) 482-6181

**Email:** [hollyportermorgan@gmail.com](mailto:hollyportermorgan@gmail.com)

**Required Textbooks and Materials:**

- *GIS for the Urban Environment*, by J.A. Maantay & J. Ziegler, ISBN- 978-1589480827
- A *USB flash drive* is required for this course. It should be at least 8 GB (preferred). Prices can vary and this item is available from your bookstore, but is cheaper at other stores.

\* You are required to have your book and USB drive by the beginning of week 2.

**Course Description:**

This course covers basic concepts and theories of Geographic Information Science (GISc), and provides hands-on experience with the industry-standard Geographic Information Systems (GIS) software package for computer mapping and data analysis. The course covers the entire GIS production process from data acquisition and input, to editing, analysis and cartographic output. Through a series of lectures, readings, and GIS laboratory exercises, students are taught the variety of ways GIS can be used in the natural and social sciences, as well as many other fields. GIS is beneficial to any field using information that is linked to geography, such as environmental management (including soil science, geology, ecology, and hydrology), crime analysis, economic development, real estate, urban planning, public health administration, epidemiology, archaeology, marketing, political science, navigation, and tourism, as well as the traditional geographic fields of cartography, demography, climatology, and natural resources.

Laboratory exercises will include data input, generation of statistics, data analysis, and the production of thematic maps and charts. Demographic, socio-economic, environmental, land-use, and biological data sets will be utilized in the lab exercises. In addition, students will participate in a community mapping project and collect local environmental data for a final hands-on database creation experience.

## Learning Outcomes:

By the end of the semester, successful students will:

- Demonstrate a solid, working knowledge of primary GIS skills.
- Define key geographic concepts, GIS terminology, components of a GIS, and GIS applications.
- Articulate an understanding of GIS processes, data sources, collection, and input, to methods of database management, analysis, and outputs for effective cartography.
- Analyze spatial data with spatial tools including geoprocessing and raster overlay and reclassification.
- Demonstrate the use of GIS in ecology, sociology and business with respect to environmental science, and understand the career options available to GIS analysts.
- Collect and analyze local data for an environmental project.

## Requirements and Grading:

40%	Lecture Exams
35%	Laboratory Assignments
5%	In-class Lab Practicums
15%	Homework/Activities, Course Project
5%	Attendance and Class Participation
<b>100%</b>	<b>Total</b>

\* **No late work will be accepted without a valid approved excuse and prior notification. NO EXCEPTIONS.**

\*\* **All assigned lab work should be turned in via email with the student's name and SCG150 in the file name.**

## Course Policies:

Email: Students are required to maintain and check their email accounts daily during the semester. **“SCG150-your name” needs to be in the subject line of anything you send to me or I will not open it.** I will utilize Blackboard, as well as a service called Dropbox, to post readings, reminders, data, and any other documents for the course.

\* If you email your professor, remember that this is a professional relationship. You need to include an address (e.g. Dear Professor,) and write with correct punctuation and capitalization.

All work submitted electronically MUST follow the following naming convention:

***LastName\_FirstInitial\_AssignmentName*** (e.g. “Morgan\_B\_Lab2”)

Failing to name your assignments in this way often leads to overwrites when I download the attachments from my email. I am not responsible for material accidentally overwritten due to this kind of error.

On the first page of each lab or other assignment, you **must** include your name, the date, and assignment number or lab/assignment name. Also, please complete your work using a word processing program (such as Word). **Do not copy/paste your work in the body of an email.**

Adaptations: If you need course adaptations or accommodations because of a disability or if you need special arrangements, please bring it to my attention on the first day of class.

Attendance: *Class attendance is mandatory.* Students are expected to participate in each class session, be punctual (on-time) to all scheduled meetings, and complete all coursework by the due dates assigned. It is your responsibility to make up work missed due to any absence. If you know in advance that you will miss a class you should notify me in advance so that it can be an excused absence. If your absence exceeds 20% of class time, you will receive a grade reduction for the course. Also, as no late work is accepted, your grade will suffer further if you do not attend classes.

***\*\*\*No eating or drinking in the lab. This is a computer lab, not a lecture hall, and the rules are different. Our use of it is a privilege, not a given right.***

*Laboratory attendance is mandatory.* The USB drive and textbook must be brought to each laboratory class. Students should have read through the laboratory exercises prior to entering the laboratory (see Notes below).

This strict attendance policy is for your own good, seriously. We are going to cover a LOT of material, and if you fall behind in your work (particularly your lab assignments), it will be extremely difficult, if not impossible, to catch up. In GIS, there's no such thing as a crash course, you simply must keep up with your work.

Courtesy: Please turn off your cell phones for the duration of class. I do not repeat information for people who refuse to pay attention to the lecture. If you repeatedly ignore this request, or are otherwise talking or acting in a manner that disrupts my classroom, you will be asked to leave and this will be counted as an unexcused absence. Students arriving more than 20 minutes late will be marked as an unexcused absence for the day. It is critical to be on time for each session- NO exceptions.

Cheating: The College's regulations regarding cheating will be strictly enforced. The policy on academic integrity is available at the following address:

<http://library.laguardia.edu/files/pdf/academicintegritypolicy.pdf>

Please read this information thoroughly, *academic integrity is not negotiable in any way.* A ruined academic experience can haunt you for the rest of your life, cheating is just not worth it.

### **Notes:**

Helping your fellow students can improve your own skills. However, each of you ultimately needs to be able to do the work by yourself. If you *are* helping each other, make sure you are not just giving out your own answers or results. That is not helping, it is cheating, and both parties are guilty (see Cheating above). *It also is very easy for an experienced GIS user (hint: your professor) to determine if work has been copied.* The only way to really learn this material is to do it yourself. Otherwise, finals time will be a very sorrowful experience for you.

*Read each lab exercise thoroughly* all the way through. Often, you will find that your question is answered in the next paragraph, or even the next sentence. The labs build on one another (for example, what you learn in lab 2 will be used in lab 5). Therefore, it is necessary to really grasp what you are doing. Do not just click the computer mouse, trying to just get an assignment done so you can get out of here. Try to understand and synthesize what you are doing. Otherwise, you will struggle *unnecessarily* with this material.

GIS is not "rocket science", each task is relatively easy to complete and understand with a bit of thought and effort. However, there is a LOT to learn, which can seem overwhelming at times. Try not to get frustrated. Proceed carefully, methodically, and stay focused. This course should be enjoyable, however it is demanding. The more you begin to understand, the more fun you will have with it.

## **Lecture and Laboratory Schedule:**

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**Week 1 Readings:** Chapter 1 in Maantay & Ziegler (M & Z)  
GIS in Action (GIA) Reading 1: MTA Case Study (Handout)

### **Wednesday, January 2<sup>nd</sup>:**

**Lecture:** Introduction to the Principles of Geographic Information Science (GISc)  
- Watch part 1 of the Geospatial Revolution.

**Laboratory:** Lab 1- Exploring Basic GIS Functionality (due Jan. 7)  
Lab 2- Introduction to ArcGIS

### **Thursday, January 3<sup>rd</sup>:**

**Lecture:** GIS and the history of cartography; Discuss GIA 1

\*Go over requirements for *Activity 1: GIS on the Internet* (due Mon. Jan. 7<sup>th</sup>).

**Laboratory:** Lab 3- Displaying and Manipulating Spatial Information (due Jan. 7)

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**Week 2 Readings:** Chapter 2 in M & Z

GIA Reading 2: Health and Environmental Justice Case Study (In M & Z, pp.393-407)  
GIA 3: Urban Forest Management (Handout)

### **Monday, January 7<sup>th</sup>:**

**Lecture:** \**Activity 1 written portion due*, Spatial data and data models.

**Laboratory:** Lab 4- Making a Thematic Map (due Jan. 9<sup>th</sup>)  
Lab 5- Selecting and Displaying Features (due Jan. 9<sup>th</sup>)

### **Tuesday, January 8<sup>th</sup>:**

**Lecture:** \**Activity 1 presentation portion due*, Present and discuss *Activity 1*.

- Watch part 2 of the Geospatial Revolution.

**Laboratory:** Lab 6-Environmental Health and GISc: Lead Poisoning in NYC (due Jan. 10<sup>th</sup>)

### **Wednesday, January 9<sup>th</sup>:**

**Lecture:** Mapping concepts, scale, generalization, coordinate systems, and projections.

**Laboratory:** Lab 7- Displaying and Manipulating Attribute Data (due Jan. 10<sup>th</sup>)

### **Thursday, January 10<sup>th</sup>:**

**Lecture:** Discuss GIA 2 and 3

- *In-class Activity*- Spatial Data

**Laboratory:** Catch-up and finish all lab assignments due today

Lab 8- Thematic Mapping: Dot Density Maps (due Jan. 15<sup>th</sup>)

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**Week 3 Readings:** Chapters 3 and 4 in M & Z

GIA Reading 4: Delivering Urban Health Care Case Study (In M & Z, pp.341-357)

GIA Reading 5: Natural Habitat Case Study (In M & Z, pp.349-355)

**Monday, January 14<sup>th</sup>:**

Lecture: *Lecture Exam #1*

Laboratory: Lab 9- Thematic Mapping: Choropleth Maps (due Jan. 16<sup>th</sup>)

Lab 10- Graphs and Maps: Designing Map Layouts (due Jan. 16<sup>th</sup>)

**Tuesday, January 15<sup>th</sup>:**

Lecture: Map typology and thematic cartography (Chapter 3)

Laboratory: Lab 11- Developing a Database from an Internet Source (due Jan. 17<sup>th</sup>)

Lab 12- Geocoding and Labeling (due Jan. 17<sup>th</sup>)

**Wednesday, January 16<sup>th</sup>:** (Classes follow a Monday schedule)

Lecture: Data classification methods, issues in data classification (Chapter 4)

Laboratory: Lab 13- Generating Buffers and Using Selections for Proximity Analysis (due Jan. 17<sup>th</sup>)

**Thursday, January 17<sup>th</sup>:**

Lecture: Discuss GIA 4 and 5, Handout Exam #2 Review Sheet

- *In-class Activity*- Thematic Maps and Data Classification

Laboratory: Catch-up and finish all lab assignments due today

Lab 14- Geoprocessing Operations and Joining Tables (due Jan. 22<sup>nd</sup>)

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**Week 4 Readings:** Chapters 5, 6, 7, and 8 in M & Z

**Monday, January 21<sup>st</sup>:** NO CLASSES

**Tuesday, January 22<sup>nd</sup>:**

Lecture: *Lecture Exam #2*; Map design and data visualization (Chapter 5)

Laboratory: Lab 15- Data Exploration and Geostatistical Analysis (due Jan. 24<sup>th</sup>)

**Wednesday, January 23<sup>rd</sup>:**

Lecture: Data sources, mapping databases, and data input (Chapters 6 and 7)

Laboratory: Lab 16- Land Stewardship in Puerto Rico: Creating Maps for Public Presentations (due Jan 24<sup>th</sup>)

**Thursday, January 24<sup>th</sup>:**

Lecture: Attribute tables and data management (Chapter 8), Handout Exam #3 Review Sheet

Laboratory: *Lab Practicum 1*

Catch-up and finish all lab assignments due today

(Possible) Field Day

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**Week 5 Readings:** Chapter 9 in M & Z, GIA Reading 6 and 7  
GIA Reading 6: Archaeology Case Study (In M & Z, pp.384-391)  
GIA Reading 7: Biodiversity in Madagascar Case Study (Handout)

**Monday, January 28<sup>th</sup>:**

Lecture: *Lecture Exam #3*

Laboratory: Lab 17- Querying Plant Collections from Puerto Rico: Using Selection Techniques (due Jan 30<sup>th</sup>)

**Tuesday, January 29<sup>th</sup>:**

Lecture: Spatial Data Analysis: Vector Data Analysis

Laboratory: Lab 18- Endangered Species and Timber Harvesting: Applying Geoprocessing Tools (due Jan.31<sup>st</sup>)

**Wednesday, January 30<sup>th</sup>:**

Lecture: Raster data analysis

Laboratory: Lab 19- Identifying Snail Habitat and Management Options in South Dakota (due Jan. 31<sup>st</sup>)

**Thursday, January 31<sup>st</sup>:** (Classes follow a Tuesday schedule)

Lecture: Discuss GIA 6 and 7

- *In-class Activity*- Manipulating Spatial Data

Laboratory: Individual Projects: Part I

Catch-up and finish all lab assignments due today

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**Week 6 Readings:** Chapter 12 in M & Z

GIA Reading 8: Ground Zero Case Study (In M & Z, pp.367-375)

**Monday, February 4<sup>th</sup>:**

Lecture: *Activity 2 due*, Present and discuss *Activity 2*

- Watch part 3 of the Geospatial Revolution.

Laboratory: Discuss Individual Project choices

Field Day

**Tuesday, February 5<sup>th</sup>:**

Lecture: Raster data analysis II and working with remotely-sensed imagery

Laboratory: Lab 20- Resource Management in Westchester County: Using R-S Images (due Feb.7<sup>th</sup>)

**Wednesday, February 6<sup>th</sup>:**

Lecture: Discuss GIA 8

Laboratory: Lab 21- Assessing Collecting Activity in Madagascar: Utilization of X-Y Data (due Feb.7<sup>th</sup>)

**Thursday, February 7<sup>th</sup>:**

Lecture: Geostatistics and spatial models

Laboratory: Individual Projects: Part II (outline sheet due by end of class session)

Catch-up and finish all lab assignments due today

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**Week 7 Readings:** Chapter 11 in M & Z

GIA Reading 9: Crime Analysis in NYC Case Study (In M & Z, pp.409-413)

**Monday, February 11<sup>th</sup>:**

Lecture: Uncertainty and Ethical Issues in GISc

Laboratory: Individual Projects: Part III

**Tuesday, February 12<sup>th</sup>: NO CLASSES**

**Wednesday, February 13<sup>th</sup>:**

Lecture: Discuss GIA 9

- Watch part 4 of the Geospatial Revolution.

Laboratory: Individual Projects: Part IV (maps and other output completed by end of class session)

**Thursday, February 14<sup>th</sup>:**

Lecture: \* *Project Results Due*, Handout Exam #4 Review Sheet, **Present and discuss *Project Results***

Laboratory: *Lab Practicum2*

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**Finals Week:**

**Monday, February 18<sup>th</sup>: NO CLASSES**

**Tuesday, February 19<sup>th</sup>:**

*Lecture Exam #4*