Course: Mapping NYC's Urban Environment: An Intro to GIS
Instructor: Dara Mendeloff
Dates: 6/29/16–8/19/16, Tuesdays and Thursdays, 9:00am–12:15pm
Total course hours: 49

SAMPLE SYLLABUS 2016

Course Objectives:

The primary objectives of this course are to provide students with an introduction to geographic information systems (GIS) using their interest in, and knowledge of, NYC natural areas as a lens, and to expand students' perspective on environmental issues through geographic thinking. This course will use interactive discussions and demonstrations, guided software explorations, independent lab exercises, field data collection sessions and readings to provide a thorough introduction to GIS.

Upon completing this course, students will be able to:

- demonstrate a strong understanding of basic GIS tools and principles
- use GIS to conceptually model real-world issues
- understand the different types of GIS concepts, such as geoprocessing, data analysis and cartography
- collect, explore and analyze spatial data
- identify ways that GIS can be utilized to understand environmental issues

Grade Breakdown:

- Class Participation: 5%
- Lab Exercises: 40%
- Quizzes: 15%
- Final Project: 40%

WEEK 1

Wednesday, June 29
Module 1. **Introduction to Maps as Simplifications of a Complex World (9am–12:15pm)**
Learning objectives & topics covered:

- Become familiar with maps and be able to identify and name elements of a map
- Be able to interpret maps using the legend
- Understand the concept of overlaying layers of map data
- Know the difference between point, line and polygon data

Thursday, June 30
Module 2. **Introduction to GIS & ArcMap (9:00am–12:15pm)**
Learning objectives & topics covered:

- Begin to understand the 5-Step GIS Process to conceptualize and model real-world phenomena.
- Explore the ArcGIS software.
- Know the difference between discrete and continuous data, and vector and raster.

WEEK 2

Wednesday, July 6
Module 3. **Visualizing Data & Attributes (9:00am–12:15pm)**
Learning objectives & topics covered:

Learning objectives & topics covered:

- Learn what an attribute is and how to create new ones.
- Use a blank map document for the first time, and calculate area.
- Become familiar with the basics of conversions and projections.

GIS-based activities or in-field data collection (1:30–4:30pm)

Thursday, July 7
Module 4. Representing Data (9:00am–12:15pm)
Learning objectives & topics covered:

- Understand that data can be symbolized in different ways.
- Explore maps that demonstrate different ways to represent data.
- Learn some tricks for the Layout View.

WEEK 3

Tuesday, July 12
Module 5. Creating, Collecting, & Editing Data (9:00am–12:15pm)
Learning objectives & topics covered:

- Learn how to create new layers and how to edit existing data.
- Learn about the power of querying.
- Explore the different attribute types.
- Practice labeling and definition queries

GIS-based activities or in-field data collection (1:30–4:30pm)

Thursday, July 14
Module 6. Introduction to Geoprocessing I (9:00am1–2:15pm)
Learning objectives & topics covered:

- Explore geoprocessing tools in ArcMap, with examples showing how they can be used

WEEK 4

Tuesday, July 19
Module 7. Introduction to Geoprocessing II (9:00am–12:15pm)
Learning objectives & topics covered:

- Build on the geoprocessing skills learned in the previous session
- Become familiar with joins

GIS-based activities or in-field data collection (1:30–4:30pm)

Wednesday, July 20
Module 8. Editing, Data Management, & Conversions (9:00am–12:15pm)
Learning objectives & topics covered:

- Introduce the concept of georeferencing
- Understand the concept of the control point, and its importance to the georeferencing process
- Learn about some of the challenges with georeferencing
- Learn how to convert vector data to raster

Thursday, July 21
Module 9. Review & Starting the Process from Scratch (9:00am–12:15pm)
Learning objectives & topics covered:

- Review the 5-Step GIS Process, reinforcing the tools learned thus far

- Be able to apply the 5-Step GIS Process to a real-world environmental issue, independently

WEEK 5

Tuesday, July 26
Module 10. Advanced Geoprocessing (9:00am–12:15pm)
Learning objectives & topics covered:
- Become familiar with buffers, spatial joins and other more advanced geoprocessing tools
- Use geoprocessing to perform a suitability analysis

GIS-based activities or in-field data collection (1:30–4:30pm)

Thursday, July 28
Module 11. Introduction to Raster GIS (9:00am–12:15pm)
Learning objectives & topics covered:
- Understand how raster data differs from vector data
- Learn the different ways to symbolize raster data
- Become familiar with basic raster analysis tools

WEEK 6

Tuesday, August 2
Module 12. Analyzing Raster Data & Inverse Distance Weighted (IDW) (9:00am–12:15pm)
Learning objectives & topics covered:
- Learn about remote sensing
- Understand the ways raster calculator and map algebra can be used for complex analyses
- Apply the concept of spatial autocorrelation, using inverse distance weighted
- Learn more advanced raster analysis techniques

GIS-based activities or in-field data collection (1:30–4:30pm)

Thursday, August 4
Module 13. Advanced Analysis Concepts (9:00am–12:15pm)
Learning objectives & topics covered:
- Learn more advanced analysis techniques that are needed for students' final projects

WEEK 7

Tuesday, August 9
Module 14. Putting It All Together (9:00am–12:15pm)
Learning objectives & topics covered:
- Be able to apply all tools and concepts covered during the course, using another type of GIS software

GIS-based activities or in-field data collection (1:30–4:30pm)

Thursday, August 10
Module 15. Finishing Final Projects (9:00am–12:15pm)

WEEK 8

Monday, August 15
Finish Final Presentations (9am–12:15pm)

Tuesday, August 16
Final Presentations (9am–12:15pm)