Introduction to Geographic Information Systems
Fall 2020, Tuesday 5:35 - 9:25 PM online

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Course Description and Objectives

This course introduces students the fundamental concepts, principles, and tools of Geographic Information Systems (GIS). It covers the basic theories and frameworks on which GIS are established. Upon completion, students will gain theoretical knowledge as well as practical skills on the structure, acquisition, management, analysis, visualization, and presentation of spatial data. GTECH 70900 is designed for students from many different departments and disciplines. The knowledge and skills obtained from this course have applications in a variety of fields in both social and natural sciences.

The online course itself is divided into two equally important parts: synchronous lectures which introduce the theories and principles underneath GIS and asynchronous lab sections which help students learn using GIS software, particularly ArcGIS Pro, to visualize and analyze real-world problems. The lectures will focus on concepts, data models, and rationales of the tools. The lab exercises are task oriented, from which students learn about processing geospatial data with software tools by following the tutorials. The course has eight required lab assignments, two exams, and one final course project.

Learning Outcomes

At the end of the semester, students should be able to
- Describe the concept of GIS and main spatial data models
- Understand the fundamentals of coordinate systems, datums and map projections
- Create basic maps and visualizations using spatial data
- Combine attribute and location data and perform queries on non-spatial and spatial data
- Conduct basic spatial data editing and analyses such as buffer
- Perform simple but complete GIS production process from data modeling and acquisition to editing, analysis, and cartographic output

Pre-requisite

None, but basic computer skills are expected.

Course Materials

Required Textbook
- Gorr, W.L. and K.S. Kurland (2020). *GIS Tutorial 1 for ArcGIS Pro 2.4*. ESRI Press.

Recommended Books:
- Albrecht, J. 2007. *Key Concepts and Techniques in GIS*. London: Sage.
- Bolstad, Paul (2012). *GIS Fundamentals: A First Text on Geographic Information Systems*, 6th ed. Acton, MA: XanEdu.

Course Calendar & Content

Week	Session	Date	Topic	Lab Assignments
1	1	09/01	Course Introduction & Logistics	
2	2	09/08	Chapter 1: Introduction to ArcGIS Platform and ArcGIS Pro	Assignment 1-1, and 1-2
3	3	09/15	Chapter 2: Map Design and Map Symbolization	Assignment 2-1, and 2-2
4	4	09/22	Chapter 3: Map Outputs and Story Maps	Assignment 3-1, 3-3
5		09/29	*Follow Monday Schedule*	
6	5	10/06	Chapter 4: File Geodatabases and Basic Data Processing	Any two of 4-1, 4-2 and 4-3
7	6	10/13	Chapter 5: Spatial Data, Data Models, and Map Projections	Assignment 5-1 or 5-2
8	7	10/20	*Exam #1*	
9	8	10/27	Chapter 6: Geoprocessing	Assignment 6-1, 6-3
10	9	11/03	Chapter 7: Digitizing and Spatial Data Editing	Assignment 7-1 or 7-2
11	10	11/10	Chapter 9: Spatial Analysis	Any two from 9-1 to 9-5
12	11	11/17	Chapter 10: Raster GIS	Optional: 10-1 or 10-2
13	12	11/24	*Exam #2*	Course Project Proposal
14	13	12/01	Web and Internet GIS	Project Development
15	14	12/08	Free and Open Source GIS	Project Development
16	15	12/15	Final Project Presentation	Project Poster
17		12/20	Last Day of the Semester	Project Report/ Documentation

Software

- ArcGIS Pro 2.X (2.4 or above preferred)
- QGIS (Free and Open Source), the latest version
- CartoDB, ArcGIS online

Grading Method & Scale

Evaluation of academic performance is based on the following components and breakdowns.

Lab exercises	40%
Exams	30%
Participation	10%
Project Proposal	5%
Project Presentation	5%
Project Report	10%

Numeric scores will be used throughout the semester. The course letter grade will be determined only at the end of the semester, although guidance as to letter grade standing will be given along the way.

Assignments are due six days after given in class. It is in your best interests to meet deadlines for assignments. In general, incomplete grades and time extensions are not an option for this course. There are no "extra-credit" assignments. Unless otherwise instructed, you will submit assignments in electronic forms through Blackboard.

To gain practical skills, lab exercises are also required for this course. Lab exercises are GIS tasks related to the core concepts or techniques discussed in the lecture. All labs assignments are designed at about 6-hour per week workload on average for those who have the necessary basic GIS skills. It is not uncommon for some who need to spend significantly more time on lab works due to their training in GIS basics or their choice of working out problems on their own instead of asking the instructor questions timely. It is strongly recommended to allocate your time evenly on assignments. For example, one hour every day is much better than six hours in a single day. Students in the class are strongly encouraged to install required software on their own computers. The computer labs are open 24/7 and all students can use the computer labs at any time outside of the posted instruction times for other courses.

Each of the students in the class will need to conduct an individual, semester-long course project that involves the analysis of a substantial geographical or spatial problem. There are no requirements with respect to software. In a similar vein, the application area (field) is also the choice of each student. Everyone in the class is also responsible for gathering the necessary data for her or his own project. Essentially, students can choose whatever topic, provided it has to do with geographical analysis. Note that each student in the class is fully responsible for her or his own project, for which the instructor will help evaluate its feasibility. A few ready-made projects are available, but experience shows that motivation increases when students take pride in their own projects.

Incomplete (IN) and Credit

The instructor cannot accommodate students who are late in their work or do not show up for the exam or presentation. And, unless you produce a medical certificate or letter from the Office of Accessibility, the instructor will not give the final grade of IN (incomplete). Graduate students are not eligible for Credit/No Credit as a final grade.

Policies

Course Website

Web-enhancement in the context of this course means that everything pertaining to this course will be communicated through Blackboard. You are required to check the Blackboard course site on a daily basis. All changes to the syllabus will be announced on the course home page. All lecture and lab materials are accessible through Blackboard, and Blackboard is also the place where you upload your assignments. Your exams and lab assignments will be graded based on what you have uploaded to Blackboard and that is where you will find your grades and may access course statistics that help you to assess your standing at any given time.

Communication

All email messages about this course should be signed with your full name as it appears in CUNYfirst. Professionalism and "*netiquette*" are expected in the communication through emails (check out those links). If your emails are not replied to in a timely fashion, please consider rewriting your emails in a better way.

Hunter College Policy on Academic Integrity

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

ADA Policy

In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical, and/or Learning) consult the Office of AccessABILITY, located in Room E1214B, to secure necessary academic accommodations. For further information and assistance, please call: (212) 772-4857 or (212) 650-3230.

Hunter College Policy on Sexual Misconduct

In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

   a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or

their local police precinct, or contacting the College's Public Safety Office (212-772-4444).

b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or-212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice. Changes will be announced in class and on Blackboard, which students are expected to check regularly during the semester.