GTECH 70900 - Introduction to GIS
Fall 2018

Lecture and lab: Wednesdays, 5:35 PM – 9:15 PM
Venue: Hunter North 1090-B
Instructor: Dr. Jochen Albrecht
E-Mail: jochen.albrecht@gmail.com
Office: Hunter N1030
Office hours: We 3-5 PM and by appointment

Course Overview:
We will cover the whole GIS production process from data modeling and acquisition to editing, analysis, and yes, cartographic output. GTECH 709 addresses students from both geography and other disciplines. Lecture examples, as well as hands-on exercises cover a range of application areas. The course itself is divided into two equally important parts: lectures, which introduce the concepts underlying all GIS, and lab exercises, which help you to familiarize yourself with many aspects of several software packages. The laboratory sessions will start at a very basic level, requiring little more than file handling and basic manipulation of Excel data. The mode of instruction is known as a flipped classroom: the course utilizes a variety of resources, including a lot of **online** materials that students are expected to peruse both before and after each week's class meeting times.

The course has two equally important parts: lectures which introduce the theory of GIScience and lab exercises which demonstrate corresponding features in GIS software. The lectures will focus on concepts, data, and tools. The laboratory exercises are task oriented; you engage with and learn about geospatial data and software tools by performing the tasks in each lab exercise. The exercises start at a very basic level, requiring little more than elementary experience with the Windows operating system.
Goal: This course is an introduction to GIS in general. We will be using a variety of **online**, web-based and desktop GIS in your lab assignments but the lectures concentrate on general principles and will note software-specific exceptions were applicable.

Objectives: You learn to see GIS as a spatial decision making process from conceptualizing spatial problems to different representations of spatial data, data sources, data organization, vector and raster analysis, and map production.

Outcomes: By the end of this course, you will have worked on and know:

1. Different GIS data models and formats and how they can be analyzed using GIS.
2. The entire GIS production process from data modeling and acquisition to editing, analysis, and cartographic output.
3. To work independently with GIS, determine what is easy to do with GIS, what will take you considerable amounts of time, and which spatial research questions do not lend themselves to a GIS solution.

Pre-requisites:
None

Required Textbook:
None; **all required** learning materials will be available on BlackBoard.

Useful Learning Materials:

- Albrecht, J. 2007. *Key Concepts and Techniques in GIS.* London: Sage. ISBN 978-1412910163 (Don't purchase it; however, it might serve you well sometime after our course to recall the concepts that you will learn in this class).

- de Smith M, Goodchild, M and P Longley. 2018. *Geospatial Analysis.* Leicester: Winchelsea Press. Free access at http://www.spatialanalysisonline.com/ or as Amazon Kindle ebook (no ISBN).
- Donnelly, F. 2017. *Introduction to GIS Using Open Source Software.* Available for free at http://faculty.baruch.cuny.edu/geoportal/resources/practicum/gisprac_2017july_fd.pdf
- QGIS. 2018. *A Gentle Introduction to GIS.* Available for free at https://docs.qgis.org/testing/en/docs/gentle_gis_introduction/index.html

Policies:

Attendance is crucial. This course emphasizes active learning, i.e., most of the learning is through practical assignments rather than tests. It is also incremental with each week's content building on material covered in prior weeks. Thus adherence to the course timetable and deadlines is very important. Active involvement in the course is evidenced, in part, by undertaking the practical assignments systematically, and learning the tools through hours of practice. In so doing the tools soon come to be a means to an end, rather than the end itself. For example, you will make many maps, and may get caught up in this creative activity, but remember that the maps are being made for scientific purposes. Class participation includes timely attendance at laboratory sessions, participation in organized class discussions, completion of in-class tasks, and accomplishment of assignments on time. Of course, you are expected to behave responsibly towards the instructor and the other students by not imposing a dominating or threatening presence in conversations and discussions, and by allowing others to speak and be heard, especially if they are shy and their voice weaker than yours.

Assignments are due one week after they are given in class. The due date will be specified in the lab exercise. It is in your best interests to meet deadlines for assignments. Incomplete grades and time extensions are not an option for this course. Unless otherwise instructed, you will submit assignments in electronic form.

Electronic recording devices are allowed during lectures. All other personal electronics should be turned off before coming into the classroom. This includes cell and smart phones.

Computers may be used for taking notes only, and if you use them for activities not related to classroom content (e-mail, Facebook chats, surfing the Net…), you will be asked gently, but firmly, to turn them off.

Lab policies are described in detail in http://www.geo.hunter.cuny.edu/techsupport/rules.html.

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

All email messages about this course should include GTECH 70900 in the subject line and be signed with your full name as it appears in CUNYfirst. Any email with question about assignments, projects and exams will be answered within 24 hours unless noted otherwise.

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. Plagiarism, dishonesty, or cheating in any portion of the work required for this course will be punished to the full extent allowed according to Hunter College regulations.

Academic dishonesty is simply not acceptable. Helping other students on use of the software is, however, encouraged.

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.

Special accommodations for persons with disabilities are provided upon request. Please see the instructor if you feel the need for them.

Hunter College Policy on Sexual Misconduct

In compliance with the CUNY Policy on Sexual Misconduct, Hunter College affirms 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 relationship. 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, on 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) of 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.

CUNY Policy on Sexual Misconduct

The policy is available at http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf

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. All changes will/would be announced on BlackBoard, which you are expected to check daily.

Criteria for Evaluation:

Evaluation of your performance is measured in theory and practice. The theory part is covered in the midterm and final exam. GIS can only be learned by doing. Hence 60% of the course grade is based on lab exercises and a final studio project. Active participation is an essential learning tool. 100 points is a definite possibility in this course. Final evaluation will be based on the following breakdown:

Evaluation	***Grade %***
Lab exercises	40%
Midterm exam	15%
Individual studio project	20%
Final exam (cumulative)	15%
Quizzes	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.

Learning Tips:
The lecture and lab material of traditional classroom sessions has been split into more than fifty smaller units. You are expected to work through these ahead of each session. Our Tuesday evening classes will then consist of (a) a short review of the material that you are supposed to have worked through ahead of time, (b) a Q&A session to clarify any remaining doubts about the theoretical material of the week, (c) a quiz on that same material, and (d) about two hours of lab time, where you work at your own pace through the lab exercise. It is unlikely that you will be able to work through the entire lab exercise in those two hours but you should be well on your way and, if necessary with the help of the instructor, familiarized yourself with the particulars of that lab. Many of these lab exercises have an in-lab and a homework component, i.e., after learning by example, you are then expected to perform a similar task on your own either with different data or using another software package. You should plan to spend on average some ***ten*** hours a week working on GTECH 709-related material – less in the beginning and more toward the end of the semester when in addition to the four components mentioned above, you will also be working on your cartographic studio project (see next paragraph). It is your responsibility to reserve these many hours in your personal life.

Each student conducts an individual software project that involves GIS analysis of a substantial geographical problem. There are no requirements with respect to what software the student uses. In a similar vein, the application area (field) is to be chosen by the student, who is also responsible for gathering the necessary data. Basically, you can choose whatever topic you want, provided it has to do with *geographical analysis*; the stress is on both words! It is your responsibility to find a suitable project, which will have to be accepted by the instructor. A few ready-made projects made available on BlackBoard will provide you with some guidance but experience shows that motivation increases when students take pride in their own project.

I will not accommodate students who are late in their work or do not show up for the final exam. And, unless you produce a medical certificate or letter from the Office of AccessABILITY, I will not give the final grade of IN (incomplete).

1. Schedule time to practice lab exercises and submit assignments on-time
2. Figure out your learning and working style – the Center for Student Achievement, HW Rm 417, offers workshops and other resources to help you succeed in class
3. Get a study buddy or form a study group, if it works for you. Find locations suitable for group study. If you learn best by yourself in a quiet environment, identify places where you can work undisturbed.
4. Learn from multiple sources - your peers, instructor, the internet, etc.
5. Read lab exercises and readings with care – never assume meanings, lookup/ask meanings of new terms, and note them for your personal GIS glossary.

Course Schedule:
(this is all quite generic as all the material will be posted all semester long; you should, however, keep this schedule in mind as a general guideline when to submit assignments and when most BlackBoard Discussion Board-based email exchanges on a particular topic are likely to occur):

Week #	***Topic***
1	Introduction; semester overview; The opportunities of GIS
2	Principles of GIS
3	GIS data formats; Lab 1: First steps with ArcGIS Online
4	Data input; where to find data; Lab 2: First steps with Quantum GIS
5	US Census data and mapping; Lab 3: Joining data with Quantum GIS
6	Address matching and georeferencing; Lab 4: Introduction to CartoDB
7	Organizing data in geospatial databases; Lab 5: Introduction to ArcCatalog
8	Midterm Exam; Setting up a GIS project
9	Projections and coordinate systems; Lab 6: Introduction to ArcMap
10	Basic GIS analysis operations; Lab 7: Spatial selection with ArcMap
11	Geoprocessing and modeling; Lab 8: Geoprocessing with ArcMap
12	Getting started with raster-based GIS analysis; Lab 9: Choice of ArcMap or SAGA GIS
13	Designing maps with GIS; Lab 10: Choice of ArcGIS Online, ArcMap, Quantum GIS or CartoDB
14	Project work and submission
15	Final Exam

It is the student's responsibility to regularly check the course website to become aware of changes to the schedule or other announcements.