

**GTECH 38517**  
**Free and Open Source GIS**  
Fall 2018  
Wednesday 5:35 – 8:25 PM

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**Class room:** HN 1090B-1  
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### **Course Description and Objectives**

The GTECH 38517 Free and Open Source Software GIS (FOSS GIS) course is primarily targeted at students who have already had some experience with ArcGIS and want to learn practical knowledge about low-cost, popular, alternative GIS software packages. It introduces the concept and extent of Open GIS with discussions on its advantages and disadvantages in comparison to proprietary GIS offerings. Practically, the course will focus on a desktop FOSS GIS (QGIS), spatial databases (Spatialite and PostGIS), and web service and web mapping solutions (MapServer, GeoServer, CartoDB, leaflet). A brief introduction to geospatial processing packages in R and scripting (Python, GEOS) solutions from the FOSS world will also be included. The weekly sessions will consist of a lecture and a hands-on lab, where students solve a problem using one or several of the above-mentioned tools. In the second half of the semester, students will independently or collaboratively work on a final project that requires the combination of the tools introduced to solve a real-world problem. While all required software packages are available on the lab computers, students are strongly encouraged to use their own laptops or home desktop computers during this class in order to familiarize themselves with the setup, configuration, and maintenance of the software packages introduced.

### **Learning Outcomes**

At the end of the semester, students should be able to

- Describe the concept of Open GIS and the main product lines in the FOSS GIS world;
- Design and build spatial databases using FOSS such as PostGIS or Spatialite;
- Conduct spatial data processing, integration, analysis, and visualization using desktop FOSS like QGIS;
- Develop basic web maps using existing online FOSS GIS platforms, dedicated servers, or scripting;
- Search and integrate FOSS GIS products and technologies to propose solutions for geospatial problems.

### **Textbooks**

No required textbooks. Readings and online materials are available on Blackboard. Useful resources include:

QGIS Training Manual: [https://docs.qgis.org/testing/en/docs/training\\_manual/index.html](https://docs.qgis.org/testing/en/docs/training_manual/index.html)

Using Spatialite: <http://www.gaia-gis.it/gaia-sins/spatialite-cookbook/index.html>

Introduction to PostGIS: <http://workshops.boundlessgeo.com/postgis-intro/>

Open Geo Suite: <http://workshops.boundlessgeo.com/suiteintro/index.html>

### **Pre-requisite**

GTECH 20100: Introduction to GIS, preferably also GTECH 36100: GIS Analysis.

### **Criteria for Evaluation**

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

Quiz Questions	10%
Lab exercises	30%
Exam	30%
Project Proposal	5%
Project Presentation	10%
Project Report	15%

## ***Grading and Assignments***

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 they are given in class. It is in your best interests to keep up with the work and meet deadlines for assignments. 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 on the Blackboard.

For certain weeks, students will need to answer one to five questions related to the core concepts or techniques discussed in the lecture. To gain practical skills, lab exercises are also required for some weeks. All the questions and lab exercises will be available on Blackboard. The labs exercises are designed for a 4-hour period. You are free to work with them at your own leisure either in our computer labs, in your apartment, or at your private home. You can use our computer labs at any time outside of the posted instruction times for other courses. It is your responsibility to manage your time to conduct both the labs as well as project work during the hours that the lab room is accessible. Of course, you are free to work at home as much you want – if you can arrange for access to the software that you need.

Each of you will conduct an individual semester-long software project that involves the GIS analysis of a substantial geographical problem using FOSS GIS. There are no requirements with respect to what software you use. In a similar vein, the application area (field) is to be chosen by you, who are 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 are available but experience shows that motivation increases when students take pride in their own project.

## ***Incomplete (IN) and Credit***

The instructor cannot accommodate students who are late in their work or do not show up for the exam. 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). The college's Credit/No Credit policy can be found at <http://www.hunter.cuny.edu/advising/how-to/file-credit-no-credit-cr-nc>. Requests for CR/NC must be made no later than 15 minutes prior to the start of the Final Presentations. You must satisfy any attendance requirements, complete ALL of the course assignments, and take the final exam or give your final presentation to be considered for CR/NC.

## **Policies**

### ***Attendance***

Attendance is crucial. Given that the class-learning environment is active learning, meaning that most your performance is practical assignments rather than tests, adherence to protocols and the course timetable is very important. I will be on time. So you will also be on time. It's just common courtesy. Lateness in arriving at class, both lectures and laboratory/discussion sections will not be tolerated. Active involvement in the course is evidenced in part by undertaking the mechanics of the practical assignments systematically, and learning the tools by hours of practice. In so doing the tools soon come to be seen as a means to an end, rather than the end themselves. 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 particular scientific purposes. Class participation includes timely attendance at laboratory sessions, participation in organized class discussions, accomplishments of in-class tasks, accomplishment of the preliminary assignment on time, and participation in the map poster display (if this is a part of the course this semester). Remember that a good part of your grade depends on class participation. Of course, you are expected to behave respectfully 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.

### ***Electronics in the classroom***

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 and doing the lab exercises, and if you use them for activities not related to classroom content (e- mail, Facebook chats, surfing the Internet for fun ...), you will be asked gently, but firmly, to turn them off.

### ***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 this is also the place where you upload your assignments to. 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.

### ***Communication***

All email messages about this course should include an informative subject line, which usually get proper and timely responses. They should also be signed with your full name as it appears in CUNYfirst. Professionalism and "netiquette" are expected in the communication through emails. If your emails are not replied to in a timely fashion, please consider rewriting your emails in a better way.

### ***General Lab Policies***

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

### ***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.

CUNY Policy on Sexual Misconduct Link: <http://www.cuny.edu/about/administration/offices/Ja/Policy-on-SexualMisconduct-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. Changes will be announced in class and on Blackboard, which you are expected to check regularly during the semester.

## Course Schedule

Session	Week	Date	Topic
1	1	08/29	Introduction to Open Source and FOSS GIS, Software Preparation
	2	09/05	<i>No Class – Follow Monday Schedule</i>
2	3	09/12	Basic Concepts, Getting Started, Introduction to QGIS
	4	09/19	<i>No Class Scheduled at Hunter College</i>
3	5	09/26	Introduction to PostGIS and SpatiaLite
4	6	10/03	Spatial Database and Data Management
5	7	10/10	Data Formatting, Conversion, and Integration
6	8	10/17	Advanced Applications of Desktop FOSS GIS and Spatial Databases
7	9	10/24	<b>Midterm Exam</b>
8	10	10/31	Introduction to GeoWebservices and WebGIS
9	11	11/07	GeoWebservices, CartoDB, Google My Maps, ArcGIS Map Stories
10	12	11/14	Geospatial Data in Python Web services, GeoServer, MapServer
11	13	11/21	Preparing, Processing, and Visualizing Spatial Data in R
12	14	11/28	Web Mapping and Leaflet.js
13	15	12/05	Advanced Applications of Web-based FOSS GIS
14	16	12/12	Transitioning to FOSS
15	17	12/19	<b>Final project presentations</b>

*Subject to change and changes will be announced on Blackboard course website.*