

Developing Web Maps (GGR400H1S)
Winter Semester 2016
University of Toronto

Lecture: Wednesday 10am-12pm – Location: Sid Smith 630 (GIS LAB)

Professor:

Michael J. Widener, Ph.D. M.S.

Office: 5037 Sidney Smith Hall

Office Hours: Wednesday 2pm - 3pm, Thursday 9am-10am

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Required Materials:

- Access to GIS Lab in Sid Smith
- Internet/Computer
- Mapbox Account: Acquire a free account via Mapbox.com
- Google Account: Acquire a free account via Google.com
- Codecademy Account: Acquire a free account via codecademy.com
- <https://www.mapbox.com/developers/api/>

Course description:

This course explores the power of web mapping and online GIS, with a focus on hands-on learning and open source software. Students will study relevant software (exploring various APIs), data structures, methods, and cartographic and visualization techniques. Finally, students will work in groups to develop and deliver their own online web maps from scratch, on a topic of their choosing.

Learning Outcomes:

After completing the course requirements, students will be able to:

- 1) Understand and build datasets in formats commonly used in online mapping platforms
- 2) Conceptualize, design, and manually build web maps
- 3) Conceptualize, design, and programmatically build web maps
- 4) Integrate GIS analysis tools into web maps
- 5) Create high quality, interactive web maps from scratch

Grading:

Reaction Papers (15%)

Lab Assignments (10%)

Project Proposal Documents (10%)

In Class Assignments (5%)

Final Group Project (45%)

Final Group Presentation (15%)

Course Organization:

This course will have a two-hour hybrid lecture-lab every Wednesday at 10am. During this period I will present concepts and teach methods related to mapping information in an online context.

The beginning of the class will focus on introducing the differences between 'typical' GIS and online cartography/GIS. The middle of the course will focus on more advanced visualization and integrating quantitative analysis into web maps. The last few weeks of this course will be dedicated to a group project where students will work in teams (picked randomly by the professor) to create a web map product from scratch, on a topic of their choosing that includes advanced GIS analysis capabilities. Teams will present their work, describing their data, implementation strategy, visualization strategy, user interface, and significance.

Outline of Course (adjustments may be made to ensure all material is covered):

Week Number	Course Topic	Reading/Lab	Lab/Reaction Paper Due Date
Week 1 1/13/16	Basics in HTML, CSS, and JavaScript	Javascript Code Academy	10am, 1/27/16
Week 2 1/20/16	Basics of web mapping	Haklay, Singleton, and Parker 2008: Web Mapping 2.0	10am, 1/27/16
Week 3 1/27/16	Common spatial data structures for web maps	Lab Assignment 1	10 am, 2/3/16
Week 4 2/3/16	Web mapping visualization: tiles and layers	Neumann 2008: Web Mapping and Web Cartography	10 am, 2/10/16
Week 5 2/10/16	Using javascript to build maps (group project proposals due)	Lab Assignment 2	10 am, 2/24/16
2/17/16: Break Week			
Week 6 2/24/16	Using javascript to build maps: refresher and extensions	None	None
Week 7 3/2/16	Intermediate .js for web maps: user interactions and interface	Lab Assignment 3	10 am, 3/9/16
Week 8 3/9/16	Intermediate .js for web maps: user interface and visualization (group project update due)	Roth et al. 2015: A process for keeping pace with evolving web mapping technologies	10 am, 3/16/16
Week 9 3/16/16	GIS analysis in javascript for web maps	Lab 4	10 am, 3/23/16
Week 10 3/23/16	Custom GIS analysis in javascript for web maps	Sui & Goodchild 2011: The Convergence of GIS and social media	10 am, 3/30/15
Week 11 3/30/16	Group project work week	None	None
Week 12 4/6/16	Group project presentations	None	None

Reading Schedule and Expectations:

Reading will be assigned throughout the semester. The current line up of articles (which will be posted on Portal) is as follows, but is subject to change:

1. Haklay, M., Singleton, A., & Parker, C. (2008). Web mapping 2.0: The neogeography of the GeoWeb. *Geography Compass*, 2(6), 2011-2039.
2. Neumann, A. (2012). Web Mapping and Web Cartography. In *Springer Handbook of Geographic Information* (pp. 273-287). Springer Berlin Heidelberg.

3. Roth, R. E., Donohue, R. G., Sack, C. M., Wallace, T. R., & Buckingham, T. (2015). A Process for Keeping Pace with Evolving Web Mapping Technologies. *Cartographic Perspectives*, (78), 25-52.
4. Sui, D., & Goodchild, M. (2011). The convergence of GIS and social media: challenges for GIScience. *International Journal of Geographical Information Science*, 25(11), 1737-1748.

A 500 words (or more) write up is to be submitted via Portal prior to the deadline described in the course outline. Students will earn a letter mark (e.g. A, A-, B+, B...) based on their level of engagement with the article, meaning that they demonstrate they read and understood the article, as well as critique or suggest future directions for the research described in the paper. An A mark will only be given out to the very best reaction papers. Students who demonstrate a moderate level of engagement will receive C marks, while students who simply describe what the paper has said will receive D marks.

Lab Assignments:

Through the semester Professor Widener will assign independent assignments that are to be completed by the deadlines described in the course outline. These labs will involve a technical and descriptive component, where students will be conceptualizing, developing, and programming their own web maps.

Group Project:

The group project at the end of this course will involve a team of 3-4 students, picked by the professor. They must work with open data or a local organization to develop a web mapping service that involves the following:

- acquiring and curating their own data
- developing a web map using javascript and MapBox (or a leaflet API of their choosing)
- customizing the user interface and visualizations
- implementing a GIS analysis / interactive feature

During the final week of term, groups will present their projects to the rest of the class – including a live demonstration of their work. A 2,000 word report on the project will also be due.

Reminder of FAS Marking Scheme:

Percentage	Letter Grade	Point Value	Grade Definition	
90-100	A+	4.0	Excellent	Strong evidence of original thinking; good organization; capacity to analyze and synthesize; superior grasp of subject matter with sound critical evaluations; evidence of extensive knowledge base.
85-89	A	4.0		
80-84	A-	3.7		
77-79	B+	3.3	Good	Evidence of grasp of subject matter, some evidence of critical capacity and analytic ability; reasonable understanding of relevant issues; evidence of familiarity with literature
73-76	B	3.0		
70-72	B-	2.7		
67-69	C+	2.3	Adequate	Student who is profiting from the university experience; understanding of the subject matter and ability to develop solutions to simple problems in the material.
63-66	C	2.0		
60-62	C-	1.7		
57-59	D+	1.3	Marginal	Some evidence of familiarity with the subject matter and some evidence that critical and analytic skills have been developed.
53-56	D	1.0		
50-52	D-	0.7		
0-49	F	0.0	Inadequate	Little evidence of even superficial understanding of subject matter; weakness in critical and analytic skills; limited or irrelevant use of literature.

Late assignments:

Late lab assignments and reaction papers will be penalized 15% each day until they are 5 days late, at which point students will receive a 0% on the late work.

Students who miss an assignment but produce one of the following documents will be allowed to hand in their work late, with no penalty. The deadline for these assignments should be discussed with the professor and will be determined on a case-by-case basis:

- **UofT Verification of Illness or Injury Form:** This form, available to students online, is restricted to a select group of medical practitioners and provides responses to the relevant questions about the absence.
- **Student Health or Disability Related Certificate:** A streamlined variant of the UofT Verification of Illness or Injury Form provided by our own internal doctors who can vouch for health problems without so many details.
- **A College Registrar's Letter:** This is a letter that only senior College Registrarial staff are authorized to write. It should identify itself as a "College Registrar's Letter."
- **Accessibility Services Letter:** This sort of letter may address needed accommodations or document on-going disability issues that have made absence or lateness unavoidable.

Make up midterms or exams will not be given, unless a student produces any of the above documentation. For more on late and missed work, please refer to the academic handbook:

<http://www.artsci.utoronto.ca/faculty-staff/teacher-info/academic-handbook-for-instructors>

General student issues:

If students have any questions or issues not covered in the syllabus, they are expected to email the professor or speak with him after class or during office hours.

Accessibility Needs:

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: disability.services@utoronto.ca or <http://studentlife.utoronto.ca/accessibility>

Academic Integrity:

All work turned in by students must be their own. Do not cheat or plagiarize. The Department and University treat all cases of cheating and plagiarism as serious offenses and sanctions are severe. You should be familiar with the university's Code of Behaviour on Academic Matters:

<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>.

Note also that using information directly from sources such as books, articles, videos, the Internet or work of fellow students without proper citation is considered plagiarism. Quotation marks are required when using someone else's words. Changing a few words in a sentence is not enough to make it your own.

Please refer to this U of T document for more information about plagiarism: "How not to plagiarize" (<http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize>).