GEOG 483: The Geoweb and Location-Based Services **Fall 2018**

Dr. Peter Johnson (peter.johnson@uwaterloo.ca)

Course meeting time: 11:30-2:20, Monday, EV2 2002

Course Outline: In recent years, a flood of place-based information has been contributed online by individuals. Though many GIS packages have long had mobile components, the widespread availability of GPS-enabled mobile computing devices (cellphones, smartphones, tablets) has led to dramatic changes in the ways that we interact with location information. As adoption of these devices increases, we are approaching an era where potentially every individual, building, and object will be broadcasting its location online. **Prerequisites: GEOG 381 or permission of instructor**

Course aims and objectives: This course takes a critical approach to understanding the development, implementation, and evaluation of the Geoweb and location-based services (LBS). These technologies are placed within broader societal concerns, including privacy, the nature of digital participation, and digital divides. Students will gain a high-level knowledge of the history, development, and current state of the Geoweb and LBS, from a GIScience perspective. This course is directed at students with some background in GIScience, who have ideally taken an undergraduate course in GIS. Knowledge of a computer programming or web development language (HTML, Javascript, Python) is an asset, but not required.

This course will mix lecture-style delivery of content with structured group discussions of academic papers and practical examples. To enhance the learning experience, students will complete five laboratory assignments, each designed to support the development of technical skills. These assignments include:

1) **Introduction to OpenStreetMap (OSM):** Learn to use OSM to create and edit geographic content. Download extracts from OSM to use in creating a map with open source software (QGIS). Students reflect on critical aspects of data quality of volunteered data as well as features and user interaction aspects of QGIS.

2) **Using commercial web mapping tools to work with open data:** Access government open data sources and use a commercial Geoweb platform to manipulate and visualize the data. Students reflect on data access and manipulation challenges and tools.

3) **Coding a basic Geoweb site:** Use a javascript library (Leaflet or mapbox) and web tools (html, css, geojson) to develop a basic Geoweb site.

4) **Using python to create a map:** Geopandas, Jupyter notebooks for making maps without a GIS.

5) **Location-based services and geofencing:** Use smartphone automation software (Trigger, Tasker) and hardware (NFC tags) to implement geofencing and location-based interactions.

Participation in Paper Discussion Sessions: Each student (or groups of students, depending on numbers) will be tasked with reviewing a set of weekly readings and submitting a short (~250 word) reflection on each reading.

Group Project: You will also work in a small team to produce a project on a topic of your choice, as well as a tutorial and hands-on assignment related to your project. You will instruct the class in this assignment in a workshop-style format that will then be partially evaluated by the class. Topics can be technical software development or more theoretical GIScience-related issues (human-computer interaction, for example). This provides an opportunity for students across the technical skill spectrum.

Assessment

Assignment #1 - OSM	10%
Assignment #2 – Open Data and Geoweb	10%
Assignment #3 – HTML/Geojson/Leaflet	10%
Assignment #4 – Python/Jupyter notebooks	10%
Assignment #5 – Geofencing and LBS	10%

Paper Discussion Sessions	10%
Group Project	40%

Course schedule and outline of lecture topics*

Week #	Topic	Readings	Assignment
Week #1 Sept 10	L01: Course Outline, Expectations, Introduction to the Geoweb and LBS - What is GIScience and how is it changing? - How this class will work - What is the Geoweb and LBS	1. Goodchild (2007)	
Week #2 Sept 17	L02: Open Base Mapping - All about osm and citizen science/vgi - Quick QGIS	2. Haklay (2010) 3. Haklay (2013)	Assignment #1: VGI and OSM
Week #3 Sept 24	L03: Foundational concepts: - PPGIS, PGIS, and critical GIS.	4. Sieber (2006)	Assignment #2: Accessing open data and visualization via Geoweb Assignment #1 due at the start of class
Week #4 Oct 1	L04: Open Data	5. Sieber & Johnson (2015)	Assignment #3 Developing a Geoweb site with leaflet/geojson Assignment #2 due at the start of class
Week #5 Oct 8 – No Class Thanksgiving Day			
Week #6 Oct 15	L05: The Geoweb – social issues	6. Crampton (2013) 7. Stephens (2013) 8. Scassa (2013)	Assignment #3 due at the start of class
Week #7 Oct 22	L06 – Designing the Geoweb – tools and techniques		Assignment #4: Making maps with Jupyter notebooks

Week #	Topic	Readings	Assignment
Week #8 Oct 29	L07: Location Based Services: principles and design	9. Thatcher (2013) 10. Evans-Cowley (2010) 11. Blumenstock (2015)	
Week #9 Nov 5	L08: Net localities: how mobile technologies are reshaping society		Assignment #5 Location based services, NFC tags Assignment #4 due at the start of class
Week #10 Nov 12	L09: Artificial Intelligence and the Smart City		
Week #11 Nov 19	Grad Student Presentations		Assignment #5 due at the start of class
Week #12 Nov 26	Project presentations and workshops		
Week #13 Dec 3	Project presentations and workshops		Project due at the start of class

* **The instructor reserves the right to alter this schedule**

Lateness: Please understand that all assignments and projects are to be completed on time. Late submissions will not be accepted without a valid doctor's note.

*****EXTREMELY IMPORTANT INFORMATION***PLEASE READ THIS*****

Accommodations and Access: I want this class to be open and accessible to everyone, and to be a safe, welcoming, and collegial environment. So, please feel free to sit where you like, eat snacks, use a laptop, and come and go from the classroom when you need to, so long as none of these activities disturb the learning experience of other students. I recognize that classroom learning can be challenging, and I will try and reduce barriers to access in general and also work to meet any specific accommodation needs you may have. You can approach me directly, after class, in my office hours, or via email to discuss any accommodation. Some specific accommodations, such as note taking, extended test writing times, learning technology support, and other can be arranged at the AccessAbility office (located in Needles Hall, Room 1401, (https://uwaterloo.ca/disability-services/)). Please register with this office at the beginning of each academic term.

Mental Health: Pretty much every student has or will face some type of mental health challenge in their time at university. There are many types of physical and emotional challenges that can make it difficult to do your best work and enjoy your studies. **You are not alone, and help is available from many different places**. If you need help, go immediately to the place you feel most comfortable; your residence don, your friends, your professors (including me!), or to Counselling Services http://www.uwaterloo.ca/counselling-services, located on the 2nd floor of the new Needles Hall expansion. Counselling Services is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more. Above all, seek help – these are challenges that you do not need to face alone.

Academic Integrity Policies

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check www.uwaterloo.ca/academicintegrity/.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity [check www.uwaterloo.ca/academicintegrity/] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, www.adm.uwaterloo.ca/infosec/Policies/policy71.htm. For typical penalties check Guidelines for the Assessment of Penalties, www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm.

Within ENV, those committing academic offences (e.g. cheating, plagiarism) will be placed on disciplinary probation and will be subject to penalties which may include a grade of 0 on affected course elements, 0 on the course, suspension, and expulsion.

Appeals: A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) www.adm.uwaterloo.ca/infosec/Policies/policy72.htm.