EPSC 240 Geology in the Field

3 credits - Fall 2018

eps.mcgill.ca/~courses/c240

DRAFT SYLLABUS - SUBJECT TO REVISION
CHECK COURSE WEBSITE FOR UP-TO-DATE INFORMATION

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Office Hours: Mon 2:30-3:30 pm

TAs:
Fiona D'Arcy (fiona.darcy@mail.mcgill.ca)
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TA office hours: Fridays, 10-11 am
Fiona, FDA 130A, Sept 7-Sept 28
Lauren, FDA 131B, Oct 5-Oct 12; Oct 26-Nov 2
Shane, FDA 130A, Nov 2-Nov 23

Meetings: Mon & Wed 1:35 - 2:25 and Wed 2:25 - 5:25. Room FDA 348

Most Wednesdays will involve field trips. You will depart McGill at 1:35 and return ~5:25. On some days we will depart McGill as a group. Other times we will meet at a designated location in Montréal (easily accessible by public transit or a short walk from campus). Field trips will go on RAIN OR SHINE unless something truly exceptional happens - e.g. an early blizzard - in which case we will change the order of field exercises and indoor labs. Some field trips will be off-island in vans - it is possible that we will experience traffic while trying to return to McGill campus, in which case, we may be late. There will be two 1-day trips on weekends. In these weeks, Wednesday lecture and lab will be cancelled.

Prerequisites: None

Course Overview:
Geologists discover fundamental facts about earth's history, evolution and the deep structure of our planet, and identify geologic resources such as groundwater, minerals and hydrocarbons - all based on making observations of rocks at the earth's surface. A field geologist must be familiar with many types of rocks, know how to record basic observations, and be acquainted with the literature and conventions of practice by which geologists report their findings to others.

Lectures and field-based exercises, held locally on campus and in the Montréal area, introduce students to the reading and interpretation of a topographic map, the basic description of a stratigraphic section and the inference of its depositional environment, the nature of intrusive contacts, and the field measurement of some structural features and geophysical properties. Students plot geological information on a map, identify landforms in aerial views and learn the tectonic features diagnostic of plate margins. By the end of the course, the students relate a geological map to the geological history of Québec.

Learning outcomes
By the end of this course, you should be able to:

- Go up to an unfamiliar outcrop, ask appropriate questions, make observations and collect useful data, analyze your observations and data, and make interpretations regarding the processes of formation of the rocks.
- Analyze the features of rocks in outcrop and/or the distribution of rocks on a map to evaluate the geological events that happened in the past.
- Research information on the geology of an area and present it to an appropriate audience.

Instructional Methods
The course will include one lecture per week (most weeks) and one 4-hour field or laboratory exercise focused on making and reporting geologic observations.

Textbook: Freeman, Tom, *Geology Field Methods*, 2010. Friendship Publications, Columbia, MO, USA. 111p. Available from instructor for $15 USD or $20 CAD.

Required Course Materials:

- Bound field notebook with a hard cover (no spirals or thin tape bindings). Rite-in-the-Rain is by far the best for field geology, and has enough pages to get you through one or maybe two more field courses after this one. Alternatives include Moleskine notebooks (available at fine paper stores and art suppliers). Book should be ~4.75" x 7.5" / 12 cm x 19 cm.
- Hand lens (loupe or magnifying glass) with x5 - x10 magnification
- Pencil crayons (set of 12 different colours)
- Sharp pencils (I prefer mechanical pencils)
- Fine-line black permanent pen
- Protractor and ruler (10 cm or longer)
- Hiking shoes or boots (will get wet/muddy)
- Warm clothes and rain jacket (umbrella optional)

Policies
McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offenses under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/academicrights/integrity/cheating for more information)

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

End-of-course evaluations are one of the ways that McGill works towards maintaining and improving the quality of courses and the students' learning experience. You will be notified by e-mail when the evaluations are available on Mercury, the online course evaluation system. Please note that a minimum number of responses must be received for results to be available to students.

This class involves walking, light hiking, and taking public transportation. It is my intention to make sure every student can participate and look forward to working with each student to make field geology as accessible as possible. I endeavour to provide an inclusive learning environment. If you experience barriers to learning in this course, do not hesitate to discuss them with me and the Office for Students with Disabilities, 514-398-6009.

Evaluation

Evaluation for this course will be based on the assignments carried out on field trips and in labs throughout the semester. 100% of the grade will be based on these assignments (breakdown shown below). Grading will be based on the accuracy and completeness of data collection and also on problem solving based on the collected data. Specific instructions for each assignment will be handed out in class as they arise. *Work handed in after the deadline will incur a penalty of 10% per day.*

Attendance in lectures and labs will not be marked. However, *regular attendance is required for completion of all the exercises,* since we can't run make-up field trips for a student who is absent. If you have to miss a lab for health or other reasons, please let me know as soon as possible, and I may be able to arrange a supplementary assignment.

Note: the first few assignments will start in the Wednesday lab and be turned in on the following Monday. These assignments are shorter and prompt feedback is more important at the beginning when you're still figuring out how to do things. Later on, you will have one week to turn in most assignments to allow more time for working on them, and the assignments will be worth more points.

ASSIGNMENT	**DUE DATE**	**MARKS**
First outcrop description	Mon Sept 10	no mark, only feedback
Pace & compass exercise	Mon Sept 17	5%
Sand quarry exercise	Mon Sept 24	10%
Topographic map on Mt Royal	Wed Oct 3	5%
Geology in 3D - sketching w/ Covo and Mellin	Wed Oct 10	5%
3D info from geologic maps	Wed Oct 17	5%
Plutonic and metamorphic rocks (Grenville trip)	Mon Oct 29	10%
Metasediments and folds (Magog-Sutton trip)	Mon Nov 5	10%
Hammer seismics exercise	Wed Nov 7	10%
Volcanic rocks on Île Ste-Hélène	Wed Nov 14	10%
Landforms with Google Earth	Wed Nov 21	5%
Cross section & 3-point problem	Mon Nov 26	5%
Geology of Québec presentation	Wed Nov 28	5%
Geology of Québec report	Tue Dec 4	15%

Course Content and Schedule:

Week	Date	Lecture/Lab	Due today
1.	**Sept 3**	**No lecture** (Labour Day)	
	Sept 5	Intro to the course & first outcrop description *(meet in FDA 348, then we'll walk up to Mt Royal)*	
2.	**Sept 10**	Geological maps, scale & orientation measurements	Turn in first outcrop description in notebooks (for feedback only)
	Sept 12	Pace & compass exercise, using geologic compass *(meet in FDA 348, then we'll walk to centre of campus)*	
3.	**Sept 17**	Describing and measuring sediments	Pace & compass lab (5%)
	Sept 19	Sand quarry trip – Sediments description & Quaternary geology *(vans depart from FDA Courtyard at 1:35 sharp)*	
4.	**Sept 24**	Topographic & geological maps	Sand quarry trip report (10%)
	Sept 26	Topographic map reading with GPS *(meet in FDA 348 or at Mt Royal cemetery, Chemin Remembrance & Voie Camilien-Houde)*	
5.	**Oct 1**	**No lecture** (classes cancelled for Québec election day)	
	Oct 3	Geology in 3D lab: Sketching & observing on Mt Royal (w/ David Covo and Robert Mellin)	Topographic map lab (5%)
6.	**Oct 8**	**No lecture** (Thanksgiving)	
	Oct 10	Extracting 3D info from geologic maps *(in FDA 348)*	Geology in 3D lab (5%)
7.	**Oct 15**	Igneous and metamorphic rocks	
	Oct 17	**No lab** (replaced by trip on Saturday)	3D info from geologic maps (5%)
	Oct 20	Grenville field trip - Gneisses, scariness and granite *(Whole day trip – meet 9 am at Milton Gates)*	
8.	**Oct 22**	Introduction to deformation structures	
	Oct 24	**No lab** (replaced by trip on Saturday)	
	Oct 27	Magog-Sutton field trip - Slates, greenstone, folds *(Whole day trip – meet 8:30 am at Milton Gates)*	
9.	**Oct 29**	Folds and interpretation using stereonets	Grenville trip report (10%)
	Oct 31	Shallow subsurface geophysics: Hammer seismics *(meet in FDA 348, then we'll walk to centre of campus)*	
10.	**Nov 5**	Volcanic rocks and diatremes	Magog-Sutton trip report (10%)
	Nov 7	Volcanic rocks on Île Sainte Hélène *(Metro field trip! Meet in FDA 348, or at 2:30 pm at parking lot P13, Parc Jean Drapeau)*	Hammer seismics lab (10%)
11.	**Nov 12**	Landforms - Relating to bedrock geology and surface processes	
	Nov 14	Google Earth lab - Landforms and interpretation *(in FDA 348)*	Île Sainte Hélène trip report (10%)
12.	**Nov 19**	Intro to plate tectonics	
	Nov 21	Cross section & 3-point problem *(in FDA 348)*	Google Earth landforms lab (5%)
13.	**Nov 26**	Geology of Québec	Cross section lab (5%)
	Nov 28	Geology of Québec presentations *(in FDA 348)*	Geology of Québec presentation (5%)
14.	**Dec 3**	**No lecture**	
	Dec 4	**Last day of classes**	Geology of Québec report (15%)
	Dec 5	**No lab**	