University of Waterloo

Geography 294 *Spring 2017*
Approaches to Research in Physical Geography

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Lectures: M&W 1:00 – 2:20 pm, EV2-2002
Labs: T 10:30-12:20, 12:30-2:20, EV1-134
Office hours: Th 10:00 am – 11:30 am
TAs: Paddy Enright & Caitlin Watt

Calendar description: This course introduces students to skills for conducting research in physical geography. The emphasis is on the critical skills needed to undertake research. Selected techniques used in climatology, hydrology, geomorphology and/or biogeography research will be demonstrated and the principles behind these techniques will be explained. This course will provide students with hands-on experience in research design, field and laboratory techniques, data assembly and the interpretation of data.

Detailed course description: This course introduces students to skills for conducting research in physical geography. In the early part of the course, students will become familiar with research design and how to properly design a field- or laboratory-based experiment or field monitoring programme. This will be developed throughout the term as students write their own *individual* research proposal. Students will also be introduced to some of the techniques used by physical geographers in the sub-disciplines of climatology, hydrology, geomorphology and biogeography. For each selected technique, students will learn (1) the theory behind the technique in a classroom setting; (2) how to execute the technique in a field or lab setting; and (3) how to compile and interpret the dataset. Skills learned are relevant for careers in both a professional and academic settings. Assignments for the course will involve a series of assignments/labs and a written proposal/term project.

Learning Outcomes:

1. Students will become familiar with selected field techniques used by physical geographers, and will develop an enhanced and practical understanding of the importance of evidence-based research.

2. Students will understand the challenges associated with problem identification, research methodologies and data collection and be able to evaluate the accuracy and precision of a range of field techniques.

3. Students will apply what they have learned in the classroom and field setting and will prepare a research proposal to address a scientific research question.

Evaluation

Labs (3 out of 4, done in groups of 3 or 6) (14% each)	42%
Literature Review & Objectives (Part 1, 6 pp)	14%
Methods, Budget, Timelines (Part 2, 6 pp)	14%
Final Full Proposal (Part 3, 15 pp)	15%
Lab and Class Participation (5% lab, 10% class)	15%

Lecture, Lab and Tutorial Schedule:

Week	Day	Date	Lecture	Dates
1	M	5-01	Introduction to the course. Scientific approach to geography	
	T	5-02	***Tutorial 1: M Davies – UW Library resources for Research***	
	W	5-03	Fundamental research concepts: Introduction to the proposal	
2	M	5-08	Communicating research through writing & the literature review	**Part 1 set**
	T	5-09	***Tutorial 2: "The Coffee Tutorial"***	
	W	5-10	Data collection and physical measurements	
3	M	5-15	Experimental and non-experimental research design	
	T	5-16	***Lab 1 (rain gauge rainfall experiment) - assigned***	
	W	5-17	Sampling methods. Methods in climatology	
4	***M***	***5-22***	***Victoria Day Holiday – no class***	
	T	5-23	***Lab 2 (radiation experiment) - assigned***	
	W	5-24	Vegetation Classification Techniques	
5	M	5-29	*In class vegetation classification exercise (Ecology Lab)*	
	T	5-30	***Tutorial 3: Journal article critique (group exercise)***	**Lab 2 Due**
	W	5-31	*Student Peer Evaluation of Literature Review & Objectives*	**Pt. 1 peer evaluation**
6	M	6-05	Proposing Methods for a Project	
	T	6-06	NO LAB	
	W	6-07	Communicating research results through presentations	**Pt. 1 Due**
7	M	6-12	Methods in Hydrology – streamflow	
	T	6-13	***Lab 3 (streamflow experiment) - assigned***	
	W	6-14	Overflow if needed*	
8	M	6-19	Methods in soil sampling	
	T	6-20	***Lab 4 Soils experiment - assigned***	**Lab 3 due**
	W	6-21	*Student Peer Evaluation of Methods/Timeline/Budget*	**Part 2 peer evaluation**
9	M	6-26	Data loggers 101	**Part 2 Due**
	T	6-27	NO LAB	**Lab 4 due**
	W	6-28	Overflow if needed*	
10	***M***	***7-03***	***Canada Day – No class***	
	T	7-04	NO LAB	
	W	7-05	Ethics in research	
11	M	7-10	Overflow if needed*	
	T	7-11		**Lab 1 due**
	W	7-12	Additional Steps in Proposal Writing – Responding to Calls	
12	M	7-17	*Journal article critique (group exercise)*	
	T	7-18		
	W	7-19	Course Summary + final proposal polishing help session	
13	M	7-24	Overflow if needed*	**Part 3 Due**

* On these dates there is no lecture unless we need it for overflow from previous lecture.
NB Lab and proposal part assignments are DUE by 4pm and must be submitted (paper copies) in the dropbox in EV1 (opposite EV1-103)

Lab schedule

Day	Date	Activity	Location	Due Dates
T	05-02	Tutorial 1	In lab	
T	05-09	Tutorial 2	In lab	
T	05-16	Lab 1 assigned	In lab	
T	05-23	Lab 2 assigned	In field	
T	05-30	Tutorial 3	In Class	Lab 2 due
T	06-06	NO LAB		
T	06-13	Lab 3 assigned	In field	
T	06-20	Lab 4 assigned	In Lab	Lab 3 due
T	06-27		NO LAB	Lab 4 due
T	07-11		NO LAB	Lab 1 due
M	07-24			

Course Readings:

There is no textbook for this course but I may put materials on reserve in the library or course website as needed. The following texts will be very useful in this course:

Montello D.R. and P.C. Sutton (2013) *An Introduction to Scientific Research Methods in Geography and Environmental Studies (2nd Edition)*, London: Sage Publications, pp314. (Highly Recommended)

Parsons, A.J. and P. Knight (2005) *How to do your dissertation in geography and related disciplines (2nd ed.).* New York: Routledge, 168pp. (Online edition available) Great for the dissertations.

Hay, I. and Giles, P. (2010) *Communicating in Geography and the Environmental Sciences: Canadian Edition,* Oxford: Oxford University Press, 312pp Great for communication

Ball, P. (2017) It's not just you: science papers are getting harder to read. *Nature*, doi:10.1038/nature.2017.21751.

Various authors, (2017) *What is Knowledge*, Special issue with multiple articles. New Scientist, Issue 3119, 1 April, 2017.

Attendance and In-class Discussions: The ability to communicate via discussion is an important skill to develop for academia, the private sector and other public workplaces. Students are expected to listen carefully, be objective, and contribute to in-class discussions. Such discussions may occur in the classroom or out in the field. Your involvement in these discussions will be reflected in your participation grade. Regular attendance of this course is essential as much of the learning in this course is hands-on. A portion of your participation grade will reflect your regular attendance and participation in class (particularly group discussions and peer reviews).

Field Journals: One of the most important tools a Geographer has is the field journal. All field journals, no matter what their form, serve the same purpose: to record, describe, analyze and remember some form of data. Your journal for this class may include entries from lecture notes and readings but will largely consist of field notes. Your field journal must accompany you to each class and is *ALWAYS WITH YOU IN THE FIELD*.

PLEASE NOTE

Email Correspondence: Any email correspondence between students and myself will only be through University of Waterloo email accounts. There will be no exceptions.
Late Assignments: A penalty of 5% will be applied for each day that an assignment is late.

Students with disabilities: Students with special needs are encouraged to contact the Office for Persons with Disabilities (OPD) (Needles Hall). Please register with the OPD at the beginning of each academic term and subsequently meet with me to discuss your needs.

Academic Integrity and Discipline: 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/ for more information.]. A student is expected to know what constitutes academic integrity 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

Appeals and Grievance: 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 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

Plagiarism detection software (***Turnitin***) will be used to screen assignments in this course. This is being done to verify that use of all materials and sources in assignments is documented. Students will be given an option if they do not want to have their assignment screened by Turnitin. In the first week of the term, details will be provided about arrangements and alternatives for the use of Turnitin in this course.