



Geography 294

**Approaches to Research in  
Physical Geography**

Fall 2019

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Lectures: M, W 10:00 – 11:20 am, MC 4059  
Labs: T 10:30-12:20, 12:30-2:20, 2:30-4:20 EV1-134  
Office hours: M 11:30 am – 1:00 pm or by  
appointment

**Calendar description:** This course introduces students to skills for conducting research in physical geography. 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 setting as well as academics. Assignments for the course will involve a series of assignments/labs and a written proposal/term project.

### Learning Outcomes:

1. Students will be familiar with many of the field techniques used by physical geographers, and will have an enhanced understanding of the importance of critical thinking and research design.
2. Students will understand the challenges associated with 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 (3/4, done in groups of 3 or 6) (14% each)	42%
Literature Review & Objectives (Part 1, 6 pp)	12%
Methods, Budget, Timelines (Part 2, 6 pp)	12%
Final Full Proposal (Part 3, 15 pp)	15%
Lab and Class Participation (9% lab, 10% class)	19%

**Lecture Schedule\*\*:**

Week	Day	Date	Lecture	Proposal Due Dates
1	W	9-04	LECTURE: Introduction	
2	M	9-09	READING: Chapter 1 - Introduction ACTIVITY: Scientific approach to geography	
	W	9-11	READING: Chapter 2 – Fundamental Research Concepts, ACTIVITY: Developing Research Questions	
3	M	9-16	READING: Chapter 5 – Physical Measurements LECTURE: Methods in Climatology	
	W	9-18	READING: Coffee papers... ACTIVITY: Literature review and synthesis	
4	M	9-23	READING: Chapter 9 – Sampling LECTURE: Vegetation sampling	
	W	9-25	Overflow if needed*	<b>Research question due (2% part.)</b>
5	M	9-30	LECTURE: Methods in Hydrology - Streamflow	
	W	10-02	Overflow if needed*	
6	M	10-07	LECTURE: Soil Sampling Techniques	
	W	10-09	LECTURE: Proposing methods, budgets, timelines	
7	M	10-14	READING DAYS	
	W	10-16	READING DAYS	
8	M	10-21	ACTIVITY: Student Peer Evaluation of Literature Review & Objectives	<b>Part 1 peer evaluation</b>
	W	10-23	Overflow if needed*	
9	M	10-28	READING: Chapter 8 – Experimental and nonexperimental research designs, Chapter 10 – Statistical data analysis ACTIVITY: Planning methods	<b>Part 1 Due</b>
	W	10-30	Overflow if needed*	
10	M	11-04	ACTIVITY: Data loggers 101	
	W	11-06	Overflow if needed*	
11	M	11-11	READING: Chapter 11 – Data display ACTIVITY: Presenting a data set	
	W	11-13	ACTIVITY: Student Peer Evaluation of Methods/Timeline/Budget	<b>Part 2 peer evaluation</b>
12	M	11-18	READING: Chapter 14 – Ethics in scientific research LECTURE: Research ethics	<b>Part 2 Due</b>
	W	11-20	Overflow if needed*	
13	M	11-25	LECTURE: Responding to requests for proposals + course summary	
	W	11-27	ACTIVITY: Final proposal polishing help session	
14	M	12-02	Overflow if needed*	<b>Part 3 Due</b>

\* On these dates there is no lecture unless we need it for overflow from previous lecture.

\*\* Course schedule subject to change by instructor

\*\*\* Assignments are DUE by midnight and must be submitted (paper copies) in the dropboxes in EV1.

## Lab schedule

Day	Date	Activity	Location	Due Dates
T	09-10	Lab 1 assigned	In lab	
T	09-17	Lab 2 assigned	In field	
T	09-24	Vegetation activity	In field	Lab 2 due
T	10-01	Lab 3 assigned	In field	
T	10-08	Lab 4 assigned	In field/lab	Lab 3 due
T	11-05		NO LAB	Lab 4 due
T	11-26		NO LAB	Lab 1 due

## Course Readings:

Required textbook: Montello DR, Sutton PC. 2013. An Introduction to Scientific Research Methods in Geography & Environmental Studies. Sage: Los Angeles.

**You are expected to read the assigned chapter before coming to class as knowledge of the reading will be used during the activity**

Additional readings will be posted on LEARN as required.

**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, activities 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*.

**Late Assignments:** A penalty of 5% will be applied for each day that an assignment is late.

## PLEASE NOTE

♦ **Intellectual Property:** Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

♦ **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. The University's guiding principles on academic integrity can be found here: <http://uwaterloo.ca/academicintegrity>. ENV students are strongly encouraged to review the material provided by the university's Academic Integrity office specifically for students: <http://uwaterloo.ca/academicintegrity/Students/index.html>

Students are also expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for their actions. Students who are unsure whether an action constitutes an offense, or who need help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. Students may also complete the following tutorial: <https://uwaterloo.ca/library/get-assignment-and-research-help/academic-integrity/academic-integrity-tutorial>

When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline: <https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71>. Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance:

<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>

♦ **Note for students with disabilities:** AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

♦ **Mental Health:** The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. Please note that help is available. Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services <http://www.uwaterloo.ca/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.

♦ **Religious Observances:** Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

♦ **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. See Policy 70 - Student Petitions and Grievances, Section 4, [www.adm.uwaterloo.ca/infosec/Policies/policy70.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm). When in doubt please contact your Undergraduate Advisor for details.

♦ **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](http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm)

♦ **Unclaimed assignments:** Unclaimed assignments will be retained until one month after term grades become official in Quest. After that time, they will be destroyed in compliance with UW's confidential shredding procedures.

♦ **Communications with Instructor and Teaching Assistants:** All communication with students must be through either the student's University of Waterloo email account or via Learn. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

♦ **Turnitin:** Text matching 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. To better understand the meaning of 'similarity' in Turnitin, see [https://guides.turnitin.com/01\\_Manuals\\_and\\_Guides/Student/Classic\\_Student\\_User\\_Guide/17\\_Similarity\\_Check#Viewing\\_an\\_Originality\\_Report](https://guides.turnitin.com/01_Manuals_and_Guides/Student/Classic_Student_User_Guide/17_Similarity_Check#Viewing_an_Originality_Report). 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.