

ERTH 2415: Natural Disasters

Canada is the second largest country by area in the world, so it enjoys a wide range of landscapes across the nation. These unique landscapes offer a diverse setting within the country. However, with this diverse setting comes a wide range of natural hazards with potentially many different impacts. When these hazards intersect with vulnerable communities, they can turn into disasters. In 2016, a wildfire originating near Fort McMurray and encompassing the town causing severe damage at a cost estimated to be \$9.9 billion. The Calgary Flood of 2013 caused damages estimated at above \$5 billion. On January 27th, 1700, an estimated **M9** earthquake offshore of Vancouver Island caused an unknown amount of destruction to local First Nations settlements in British Columbia which resulted in a tsunami in Japan.

These natural hazards are caused by geological, solar, and meteorological process that many of us may experience from time to time. The aim of this course is to identify the processes causing these hazards, estimate their frequency and impacts, and understand how these turn into disasters, through relevant case studies. Students will gain an understanding of the current work in preparing, monitoring, and responding to natural disasters.

Course Learning Outcomes:

Identify the processes of Earth and how these influence Natural Hazards in Canada. For each Natural Hazard, students will:

- Explain what causes it.
- Describe the characteristics of the hazard.
- Analyze the potential impact on society and infrastructure.
- Determine how the hazard could turn into a disaster.
- Case studies of disasters focussed on Canada.

Prerequisites:

Second-year standing in any degree program or permission of the department.

Important Information:

Professor: Dr. Stephen Crane (stephencrane@cmail.carleton.ca). All emails relevant to the course must contain EARTH2415 in the subject line.

Textbook: Natural Disasters, 12 edition by Patrick Abbott. McGraw Hill. Available at the bookstore.

Lectures: 3 hours, once a week, Mondays, 18:05-20:55, Online through Zoom. Recordings of the lecture will be available within a week of the lecture.

Quizzes: Weekly quizzes to be completed online. 4-5 questions with a 10 minute time limit. There is only one attempt per quiz.

Assignments: 2 assignments due throughout the term. See details about each assignment below.

Mid-term exam: To be completed during the scheduled lecture time. Covering lectures 1-5 (inclusive). You must complete the mid-term exam to pass the course.

Final Exam: To be scheduled during the final exam period. Covering lectures 7-11 (inclusive). You must complete the final exam to pass the course.

Lecture Schedule:

Date	Lecture #	Topic
Week 1: Jan 9	1	Introduction, Natural Disasters and Humans, Origin of the Solar system, Plate tectonics
Week 2: Jan 16	2	Earthquakes I
Week 3: Jan 23	3	Earthquakes II, Tsunamis
Week 4: Jan 30	4	Volcanoes
Week 5: Feb 6	5	Mass Movements: Landslides & Snow Avalanches, Coastal processes
Week 6: Feb 13	6	Mid-term Exam
Winter Break: February 20th		
Week 8: Feb 27	7	Climate Change
Week 9: Mar 6	8	Floods
Week 10: Mar 13	9	Severe weather I
Week 11: Mar 20	10	Severe weather II
Week 12: Mar 27	11	Wildfires
Week 13: Apr 3	12	Space Weather, Impacts from space objects
Week 14: Apr 10	13	Course Summary

Course Evaluation:

		ERTH 2415
Assignments	1. Canadian Disaster Database	10%
	2. Natural Disasters in Literature/Media	10%
Weekly Quizzes	Weekly, to be completed online	20%
Mid-term Exam	February 13 th , 18:05 – 20:55	30%
Final Exam	During Final Exam period, April 15-27	30%
Total		100%

Midterm Exam (30% of final grade): During scheduled lecture time. February 13th, 18:05 – 20:55.

Final Exam (30% of final grade): To be scheduled during exam period. During Final Exam period from April 15 - 27.

Weekly Quizzes (20% of final grade): 4-5 questions, 10 minutes time limit, 1 attempt, to be completed on Brightspace. Due Mondays 18:05.

Assignment 1: Canadian Disaster Database (10%): Questions about Natural Disasters in Canada. More details are available on Brightspace. Due February 6th, 18:05.

Assignment 2: Natural Disasters in Literature/Media (10%): 1-2 page summary on a movie/book/TV show centred on a Natural Disaster. More details are available on Brightspace. Due April 10th, 18:05.

Expectations:

For the duration of the term students are expected to:

- Complete the assigned readings on time;
- Attend all scheduled class time when possible;
- Treat fellow students cordially;
- Respect due dates, or notify the professor to make arrangements before the due date

COVID-19

It is important to remember that COVID is still present in Ottawa. The situation can change at any time and the risks of new variants and outbreaks are very real. There are [a number of actions you can take](#) to lower your risk and the risk you pose to those around you including being vaccinated, wearing a mask, staying home when you're sick, washing your hands and maintaining proper respiratory and cough etiquette.

Feeling sick? Remaining vigilant and not attending work or school when sick or with symptoms is critically important. If you feel ill or exhibit COVID-19 symptoms do not come to class or campus. If you feel ill or exhibit symptoms while on campus or in class, please leave campus immediately. In all situations, you must follow Carleton's [symptom reporting protocols](#).

Masks: Carleton has paused the [COVID-19 Mask Policy](#), but continues to strongly recommend masking when indoors, particularly if physical distancing cannot be maintained. It may become necessary to quickly reinstate the mask requirement if pandemic circumstances were to change.

Vaccines: Further, while proof of vaccination is no longer required as of May 1 to attend campus or in-person activity, it may become necessary for the University to bring back proof of vaccination requirements on short notice if the situation and public health advice changes. Students are strongly encouraged to get a full course of vaccination, including booster doses as soon as they are eligible, and submit their booster dose information in [cuScreen](#) as soon as possible. Please note that Carleton cannot guarantee that it will be able to offer virtual or hybrid learning options for those who are unable to attend the campus.

All members of the Carleton community are required to follow requirements and guidelines regarding health and safety which may change from time to time. For the most recent information about Carleton's COVID-19 response and health and safety requirements please see the [University's COVID-19 website](#) and review the [Frequently Asked Questions \(FAQs\)](#). Should you have additional questions after reviewing, please contact covidinfo@carleton.ca.

Academic Integrity:

The following is excerpted from <https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy.pdf>, the University policy document on Academic Integrity:

The following list describes conduct that violates standards of academic integrity, which may lead to the imposition of sanctions pursuant to this Policy. It is important to note that this is neither a comprehensive nor a mutually exclusive list and should not be viewed as exhaustive.

1. Plagiarism Plagiarism is presenting, whether intentionally or not, the ideas, expression of ideas, or work of others as one's own. Plagiarism includes reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source. Examples of plagiarism include, but are not limited to:

- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;

- using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one's own
- failing to acknowledge sources through the use of proper citations when using another's work and/or failing to use quotations marks.

2. Unauthorized Resubmission of Work. A student shall not submit substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the second submission occurs.

3. Unauthorized Co-operation or Collaboration. Students shall not co-operate or collaborate on academic work when the instructor has indicated that the work is to be completed on an individual basis. Failure to follow the instructor's directions in this regard is a violation of the standards of academic integrity. Unless otherwise indicated, students shall not co-operate or collaborate in the completion of a test or examination.

4. Misrepresentation. Students shall not submit or present false assignments, research, credentials, or other documents or misrepresent material facts for any academic purpose.

5. Impersonation. It is a violation of the standards of academic integrity to impersonate another person or enter into an arrangement with another to be impersonated by any means for the purposes of gaining academic advantage including in the taking of examinations, tests, or the carrying out of laboratory or other assignments.

Please see <https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy.pdf> for further details.

Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and its survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline