

Faculty of Science Course Syllabus
Department of Earth and Environmental Sciences
ERTH/GEOG 1060 Natural Disasters
Winter 2021

Professor: Dr. John Gosse	John.Gosse@dal.ca for issues regarding tests, Brightspace (except homework issues) and accessibility/accommodations issues.
Instructor: Dr. Jillian Bambrick-Banks	Jill.Banks@dal.ca for questions pertaining to the homeworks
Teaching Assistant: Ms. Dawn Tobey	Dawn.Tobey@dal.ca regarding lecture material

This course will only require *asynchronous* participation. However, a number of lectures and two review sessions will be *offered synchronously* to enable live experiential learning. Those synchronous components will be recorded so those who cannot participate can still access them.

Course Description

Earthquakes, meteorite impacts, rapid climate change, volcanic eruptions, hurricanes, landslides, solar flares, and floods are natural hazards that affect our economy, public policy, and safety. Where, why and how frequently do natural disasters occur? Are precise predictions possible? This course, aimed at the non-specialist, investigates these intriguing questions. Excerpts from various media, in conjunction with lectures and discussions, are used to study the causes, consequences and perceptions of natural hazards. Global and Canadian examples of recent and noteworthy disasters are used to assess local risk and track real-time events worldwide. The course will provide a balanced treatment of the subject so science, arts, and professional school undergraduates can gain practical experience and knowledge about how we study natural hazards and attempt to minimize loss of life and property. During the semester you will travel virtually to accompany me on field research on natural hazards around the world.

Software: You will install onto your desktop or laptop [Google Earth Pro on desktop](#). Do **not** use *Google Earth on web* or *Google Earth on mobile* versions of this software because it is very difficult to make precise measurements needed for the calculations in the assignments.

University Prerequisites: Open attitude toward science

Links to synchronous (optional) events will be provided before the event. We will usually use MS-Teams®. If you do not participate in the live lecture or review, a recording of it will be posted shortly after.

All course information available from [Brightspace](#) at Dalhousie University.

Learning Objectives

Obj 1. The student will explain the triggers, conditions, basic dynamics, and energy sources that drive each natural hazard studied

Condition – Given a geophysical or climatic hazardous process

Behaviour – The student will distinguish the elements of the hazards system and the forces and energy that control magnitude and frequency

Criterion – The student will correctly explain the drivers

Obj 2. The student will calculate magnitude, frequency, and recurrence interval for a given hazard

Condition – Given data for a hazardous process

Behaviour – The student will evaluate rates, energies, and probabilities of a given hazard magnitude, including any unit conversions

Criterion – The values calculated will be correct

Obj 3. The student will recall different approaches to monitor and predict natural hazards and forecast looming natural disasters

Condition – Given a natural hazard

Behaviour – The student will explain current approaches used to obtain information to generate forecasts and predictions for each natural hazard

Criterion – The student can devise a complete and valid strategy to make a prediction for a looming disaster

Obj 4. The student will acquire an appreciation for the financial and human risks for each hazard

Condition – Given case histories of natural disasters

Behaviour – The student will compare different disasters of given hazard types, will compare the significance of difference hazards, and explore what controls vulnerability to the hazard

Criterion – The student uses specific examples from past natural disasters to appraise how location, wealth, and population density control damage and fatality level

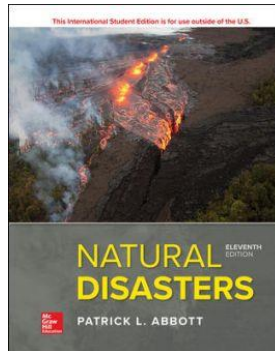
Obj 5. The student will assess the potential for a natural hazard

Condition – Given a physical address on the planet Earth

Behaviour – The student will consider the probability of any natural hazard or hazardous condition

Criterion – The qualitative assessment will be supported with geological, historical, statistical, and modeling evidence

ERTH/GEOG 1060 TEXTBOOK for Winter 2021



Course Text: **REQUIRED**

Natural Disasters, 11th edition by Patrick Abbott

eBook edition: ISBN 1264472897 (~CA\$60.00)

[Available from Dal Bookstore](#)

Important considerations:

- 1. Edition:** Buy the 11th edition *ebook*. It is the most current edition, and in this course, we will refer to some examples that are covered in this edition but not in older editions. There are data provided in Tables that have been updated to at least mid-2017, and we will use those data. This is the international edition. The 11th edition has improved significantly, because it has increased the emphasis on energy as a common thread to the different natural hazard processes, which is also reflected in the lectures.
- 2. Is an older edition ok? No.** In the past I have indicated that students can make do with a previous edition. However, there is enough new content (maybe 20%) from the previous edition that you may be missing some important information.
- 3. Formats:** Besides the *ebook*, which enables digital searching, the textbook may be available in bound (soft cover) and loose leaf. Contact the publisher to purchase those or other formats.
- 4. Learning Management Systems.** We will be using [BRIGHTSPACE](#) for our learning management system. I am not recommending McGraw Hill Higher Education Learning System 'CONNECT'.

ERTH/GEOG 1060 Winter 2021 Syllabus

Optional synchronous lectures or reviews will occur 10 am (**Atlantic Time Zone**)
Lectures posting dates and topics may vary slightly depending on a number of factors

Module	Lecture Posted	Approximate Topic	Reading
M0	01-08 F	Course overview, syllabus, how to achieve an A grade	
M1	01-12 T	Natural Hazards Concepts, Predictive Models, and Trends	Ch. 1
M2	01-14 Th	Synchronous -Energy of Natural Hazards and Exponential Equations	Prologue & Ch. 2
M3	01-19 T	Plate Tectonics	Ch. 3
	01-21 Th	Synchronous -Faults and Earthquakes	Ch. 3
M4	01-26 T	Seismic Wave Physics, EQs	Ch. 4
	01-28 Th	EQ risks, prediction, mitigation	Ch. 5
	02-02 T	Synchronous : Paleoseismology	Ch. 5
M5	02-04 Th	Volcanism: Chemistry	Ch. 6
	02-09 T	Volcanic risks, prediction, mitigation	Ch. 7
Review	02-10 W	Review of Modules M1-M5	
Test	02-11 Th	Mid-term exam on this day (Modules 1-5)	
M6	02-23 T	Tsunami-Triggers and dynamics	Ch. 8
	02-25 Th	Synchronous Landslides and Tsunami in the North Atlantic	Ch. 8,15
M7	03-02 T	Atmospheric dynamics	Ch. 9
	03-04 Th	Severe frontal storms	Ch. 10
M8	03-09 T	Hurricane risks, prediction, and mitigation	Ch. 11
	03-11 Th	Synchronous Hurricane dynamics and evolution	Ch. 11
M9	03-16 T	Tornado evolution, risks, and mitigation	Ch. 10
M10	03-18 Th	Sinking deltas and stream flooding	Ch. 13
M11	03-23 T	Synchronous Extra-terrestrial impacts and radiation	Ch. 17
Review	03-31	Review of Modules M6-M11	
Exam	TBA	Final exam (Modules 6-11 only) Exam date will be announced in Feb	

Assignment Schedule

- You will be given at least three attempts for the assignments.
- You will have at least nine days to complete an assignment.
- Depending on your background, some assignments will take more than 3 hours.
- The assignments may be completed prior to the relevant lectures. However, in many instances the lecture material and textbook will provide context and definitions that are useful to completing the assignment. We recommend completing a first attempt of the assignment prior to the relevant lecture so you better understand some of the lecture material and have time to ask questions.
- Assignments become unavailable after 11:30 pm Atlantic Time on the due date, no exceptions.
- Email Dr. Bambrick-Banks for assistance with assignment issues.

Assignment	Date Out	Date Due
0. GoogleEarth Intro	F-Jan8	T-Jan 19
1. Faults	F-Jan15	M-Jan25
2. Volcanoes	F-Jan22	W-Feb10
3. Tsunami	F-Feb12	M-Mar1
4. Hurricanes	F-Feb26	M-Mar15
5. River Flooding	F-Mar12	M-Mar22
6. Impacts	F-Mar19	F-Apr2

Course Assessment

Assignments	50%
Mid Term Test (required)	25%
Final Exam (required, not cumulative)	25%
Total	100%

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D	(50-54)
A (85-89)	B (73-76)	C (60-64)	F	(<50)
A- (80-84)	B- (70-72)	C- (55-59)		

Assignments:

There are a total of seven assignments, numbered 0 to 6 (see [assignment schedule](#)). You will complete the assignments on your own (**no collaboration with others**). The GoogleEarth Intro assignment is mandatory. You may choose not to submit one of the remaining six assignments. We will drop the lowest score of those remaining six assignments, before calculating the weighted mean value (for five of the six assignments). If you do not submit two assignments, one of them will receive a grade of zero. Plan ahead, attempt the assignments early so you are not affected by sickness, travel, or unexpected events. **The Brightspace server portal for assignments will close at 11:30 pm Atlantic Time on the due date for the assignment.**

Tests:

There will be two tests. They are mandatory.

We will provide more information about the tests later in the semester. You are responsible for material recorded in **asynchronous and synchronous** lectures and in the assignments. Material only in the textbook but not introduced in the lectures will not be tested.

The mid-term test will cover topics in all lectures, including current events mentioned in the lectures, and all assignments *prior* to the mid-term test date.

The final exam will cover all topics *after* the mid-term (*i.e.* it is not cumulative). You will have approximately 1 minute per question.

The tests will be 'open book' which means if you have time you may consult your textbook, lectures, and notes. The test questions will be mostly multiple choice, ranking, or fill in the blank style. You will not be able to return to a previous question. Each question will have the same value. Questions and answers will be randomized, and no two students should have exactly the same questions. Each student must complete the test alone, individually, without collaboration or help from anyone else. The [date of the mid-term test is fixed](#). The date of the final exam will be announced sometime in February.

University Policies and Statements for Winter 2021

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Missed or Late Academic Requirements due to Student Absence

As per Senate decision instructors may not require medical notes of students who must miss an academic requirement, **including the final exam**, for courses offered during fall or winter 2020-21 (until April 30, 2021). Information on regular policy, including the use of the Student Declaration of Absence can be found here: https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html.

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness

Statement: <http://www.dal.ca/cultureofrespect.html>

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders



in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Student Resources and Support

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html **Studying for**

Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html **Copyright Office:**

<https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness/services-

[support/student-health-and-wellness.html](https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html) **Student Advocacy:** <https://dsu.ca/dsas>

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html