

**Faculty of Science Course Syllabus**  
**Environmental Science**  
ENVS / GEOG 3400  
Environment and Human Health  
Winter 2018



**Instructor:** Daniel Rainham, PhD

**Contact Information:** Fastest contact route = Telephone: 494-1286  
Fast but less reliable = Office visit (office hours): Room 820 (LSC)  
Slower contact route = Email: daniel.rainham@dal.ca  
Even slower contact route = Waiting until next class (i.e. in person)  
Slowest contact route = Mail

**Office Hours:** Tuesdays, 12:00-13:00 (or by appointment)

**Lectures:** Tuesday and Thursday, 13:05 - 14:25, Room 338 in the LSC (Common Area)

**Laboratories:** Tuesday, 16:35 - 17:55, Room 301B in the Sir James Dunn Building

**Teaching Assistants:** Colleen Hammond, colleen.hammond@dal.ca  
Ruoqian Wang, ruoqian.wang@dal.ca

**Environmental Science Main Office:**

Location: Room 822, Life Sciences Centre, 1355 Oxford St. (Biology Tower)

Hours: Monday – Thursday, 8:30 – 12:30, except holidays.

Phone: 902-494-7117

Fax: 902-494-1123

Email: environment@dal.ca

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**Course Description**

This course examines the relationships between the health of populations and health determinants in the context of environmental sustainability. Weekly laboratory exercises will teach students how epidemiology and geographic information science can be used to assess the links between the health of human populations and the health of the environment, and how to use these tools for environmental health research.

**Course Prerequisites**

Must be a third year student or have permission of instructor. Cross-listing: GEOG 3400.03

**Class Objectives**

This course will allow students to:

- Develop an enhanced understanding of environment and human health challenges.
- Discover contemporary tools and techniques in environment and health
- Enhance literacy, numeracy and critical thinking skills as they apply to environment and health

**Brightspace:**

The class syllabus, announcements, assignments, and other relevant information will be located on the course Brightspace site (<https://dal.brightspace.com>). Please check this site regularly.

**Course Assessment**

Quizzes	=	32%
Labs	=	48%
Final Exam	=	20%

**Evaluative Components:****1. Quizzes:**

There are eight quizzes based on material contained in the readings. Each quiz will consist of short answer, definition-type questions to provide you with opportunities to demonstrate whether or not you have read and digested the reading materials. Quizzes will take place promptly at the beginning of class and each quiz will comprise 4% of your final course grade. You will have up to 30 minutes to complete each quiz. It is your responsibility to write the quiz when it is scheduled. Missed quizzes due to medical reasons (reasons that prevent student evaluation) can be rewritten or written quizzes reweighted if note from physician is obtained.

**2. Labs:**

There are six labs worth 8% of your final course grade that build on class material (lectures and readings) and will be completed in the computer laboratory environment. The labs are designed to provide you with at least one tool with which to examine and investigate the relationships between the environment and human health. The labs are GIS focused and are intensive, characterized by a rather steep learning curve. While some labs can usually be completed in the class time allotted there will be occasions when you will need to complete the work outside of class time. The GIS software (ESRI – ArcMap) is available in all labs and libraries on all four Dalhousie campuses. All lab reports are to be submitted electronically through the Brightspace website on the Monday, thirteen days following distribution (by 4:30 pm or 16:30 in the 24-hr clock). For example, Lab #1 will be distributed on Tuesday, January 23, 2018. The report for Lab #1 is due on Monday, February 5, 2018 by 4:30 pm. Lab reports will not be accepted after that time.

Lab reports must include your name and BOO# as well as the assignment number and title.

**3. Final Exam:**

During the final exam period, you will have two hours to write a final exam designed to evaluate your understanding and synthesis of the major topics and themes from the course that bear on your understanding of the relationships between the environment and human health outcomes. The exam is worth 20% of your final course grade.

The final exam period is April 12 – 26, 2018. You should plan to remain in Halifax until after the end of the exam period, or avoid making any travel plans for the winter holiday until after the exam schedule has been posted in early March 2018.

Week	Date	Topic, Quizzes, Reading(s) Assignments and Locations
1	Tuesday, Jan 9	Class orientation and introductions  Syllabus Review <ul style="list-style-type: none"> <li>• Review requirements and procedures</li> <li>• The role of the assignments and labs</li> </ul>
1	Thursday, Jan 11	No Class: Please carefully read the Syllabus, the reading below and watch the following short film.  Reading for next class: McCally M. Environment, Health and Risk. In Life Support: The Environment and Human Health. Cambridge, Mass: MIT Press, 2002. pp. 1-14.  Film: Environment, Health, You (American Public Health Association): <a href="https://vimeo.com/32226544">https://vimeo.com/32226544</a>
2	Tuesday, Jan 16	The Groundwork: What is Environment and Human Health?  NO LAB
2	Thursday, Jan 18	QUIZ #1: Quiz based on the McCally reading  Sick (healthy) Individuals, Sick (healthy) Populations: The ecological determinants of health  Reading for next class: Nuckols J, Ward M, Jarup L. Using geographic information systems for exposure assessment in environmental epidemiology. <i>Environmental Health Perspectives</i> 2011;112(9):1007-1016.
3	Tuesday, Jan 23	Thinking Spatially  Optional reading: United Nations Environment Programme. Subregional Environmental Monitoring and Information Systems-II. Chapter III: Basic GIS Concepts. Pages 24-37  LAB #1: An Introduction to ArcGIS (GIS Software)
3	Thursday, Jan 25	QUIZ #2: Quiz based on the Nuckols, Ward and Jarup reading  Geographic Information Systems: Applications to Environment and Health  Reading for next class: Howat P, Stoneham M. Why sustainable population growth is a key to climate change and public health equity. <i>Health Promotion Journal of Australia</i> 2011; 22: S34-S38. Optional Reading: Stott R. Personal View: Global health cannot be achieved without efforts to curb population growth. <i>British Medical Journal</i> 2011; 343:d7003.

<b>Week</b>	<b>Date</b>	<b>Topic, Quizzes, Reading(s) Assignments and Locations</b>
4	Tuesday, Jan 30	Drivers of Environment and Health Challenges – A look at human population growth  LAB #2: Databases in GIS: Relational and Spatial Joins
4	Thursday, Feb 1	Group Think: What would a sustainable population plan look like for Canada?  Reading for next class: <b>An introduction to epidemiology.</b>
5	Tuesday, Feb 6	Introduction to Epidemiology: People, places and time  NO LAB
5	Thursday, Feb 8	QUIZ #3: Quiz based on Craun et al. reading  Environmental Epidemiology: Case studies and insights  Reading for next class: McMichael AJ. Globalization, climate change, and human health. <i>New England Journal of Medicine</i> 2013; 368:1335-43.
6	Tuesday, Feb 13	Human Health and Climate Change: Direct and indirect effects  LAB #3: Applying GIS to Climate Change: Sea Level Rise
6	Thursday, Feb 15	QUIZ #4: Quiz based on McMichael reading  Reading for next class: Krewski D, Rainham DG. Ambient air pollution and population health: Overview. <i>Journal of Toxicology and Environmental Health</i> 2007;70: 275-283.

<b>Week</b>	<b>Date</b>	<b>Topic, Quizzes, Reading(s) Assignments and Locations</b>
7	Tuesday, Feb 20	READING WEEK – NO CLASSES OR LABS
7	Thursday, Feb 22	READING WEEK – NO CLASSES OR LABS
8	Tuesday, Feb 27	Air Quality and Human Health Effects  LAB #4: Air Quality and Spatial Interpolation
8	Thursday, Mar 1	QUIZ #5: Quiz based on the Krewski & Rainham reading  State of the Art in Air Pollution Monitoring and Human Behaviour  Reading for next class: ICNIRP (International Commission for Non-Ionizing Radiation Protection) Standing Committee on Epidemiology, Ahlbom A, Green A, Kheiftets L, Savitz D, Swerdlow A. Epidemiology of health effects of radiofrequency exposure. <i>Environmental Health Perspectives</i> 2004; 112:1741-54.
9	Tuesday, Mar 6	Electromagnetic Fields and Health  LAB #5: Investigating West Nile Virus Using Remote Sensing in GIS
9	Thursday, Mar 8	QUIZ #6: Quiz based on the ICNIRP et al. reading  Reading for next class: Donovan G, Butry D, Michael Y, Prestemon J, Liebhold A, Gatziolis D, Mao M. The relationship between trees and human health. <i>American Journal of Preventive Medicine</i> 2013;44:139-45.
10	Tuesday, Mar 13	Nature as Health Promotion  LAB #6: Neighbourhood Walkability and Risk of Chronic Disease
10	Thursday, Mar 15	QUIZ #7: Quiz based on the Donovan et al. reading  Mid-Course Review: Topics and Key Concepts  Reading for next class: Landrigan P, Kimmel C, Correa A, Eskenazi B. Children's health and the environment: Public health issues and challenges for risk assessment. <i>Environmental Health Perspectives</i> 2003; 112:257-65.

<b>Week</b>	<b>Date</b>	<b>Topic, Quizzes, Reading(s) Assignments and Locations</b>
11	Tuesday, Mar 20	Children's Environmental Health: Issues and Challenges  NO LAB
11	Thursday, Mar 22	QUIZ #8: Quiz based on the Landrigan et al. reading.  No lecture: Extra time to work on GIS lab  Reading for next class: Srinivasan S, O'Fallon L, Dearth A. Creating healthy communities, healthy homes, healthy people: Initiating a research agenda on the built environment and public health. <i>American Journal of Public Health</i> 2003; 93:1446-1450.
12	Tuesday, Mar 27	Urban Planning, the Built Environment and Human Health  NO LAB
12	Thursday, Mar 29	Focus: Physical Activity and the Built Environment  Reading for next class: Moudon AV. Real Noise from the Urban Environment: How Ambient Community Noise Affects Health and What Can Be Done About It. <i>American Journal of Preventive Medicine</i> 2009; 37:167-71.
13	Tuesday, Apr 3	Human Health Effects from Noise  NO LAB
13	Thursday, Apr 5	Short Lecture: Advancing Environment and Human Health: From Endocrine Disruptors to Epigenetics And Course Review for Final Exam
14	Tuesday Apr 5	NO CLASS (Friday classes will be held)

**Readings:**

There is no required textbook for ENVS 3400. All required and optional/supplemental readings are available in digital form on the course Brightspace site, or in some cases, from the reserve desk at the Killam Library. To access the online articles you will need to be logged into Dalhousie's internal server. You can accomplish this by either logging into any computer located on campus or using Dal's Virtual Private Network (VPN) for off-campus access. For information see: <https://wireless.dal.ca/vpnsoftware.php>.

Please refer to the detailed course schedule (above) for a list of weekly assigned readings. All readings have been carefully selected to introduce and support key concepts or learning objectives of the course. I have assigned what I believe to be a very reasonable amount of material for each class – typically limited to the equivalent of one reading per class. As such, all students are expected to access, read and be prepared to discuss all assigned readings in advance of the associated class.

**Letter Grade Conversion System**

(According to the Dalhousie University Grading System)

Grade	% Grade Value	Grade Point	Definition	
A+	90-100	4.3	Excellent	Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.
A	85-89	4.0		
A-	80-84	3.7		
B+	77-79	3.3	Good	Evidence of grasp of subject matter, some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the literature.
B	73-76	3.0		
B-	70-72	2.7		
C+	65-69	2.3	Satisfactory	Evidence of some understanding of the subject matter; ability to develop solutions to simple problems; benefitting from his/her university experience.
C	60-64	2.0		
C-	55-59	1.7		
D	50-54	1.0	Marginal Pass	Evidence of minimally acceptable familiarity with subject matter, critical and analytical skills (except in programs where a minimum grade of 'C' is required).
F	0-49	0	Inadequate	Insufficient evidence of understanding of the subject matter; weakness in critical and analytical skills; limited or irrelevant use of the literature.

## **University Policies and Statements**

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

### **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](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](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](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](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](https://www.dal.ca/academics/important_dates.html)

### University Grading Practices

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

### Missed or Late Academic Requirements due to Student Absence (policy)

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html](https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html)

## SERVICES AVAILABLE TO STUDENTS

The following campus services are available to help students develop skills in library research, scientific writing, and effective study habits. The services are available to all Dalhousie students and, unless noted otherwise, are free.

Service	Support Provided	Location	Contact
General Academic Advising	Help with - understanding degree requirements and academic regulations - choosing your major - achieving your educational or career goals - dealing with academic or other difficulties	Killam Library Ground floor Rm G28 <i>Bissett Centre for Academic Success</i>	In person: Killam Library Rm G28 By appointment: - e-mail: <a href="mailto:advising@dal.ca">advising@dal.ca</a> - Phone: (902) 494-3077  <a href="#">General Advising</a> <a href="#">Science Program Advisors</a> <a href="#">Indigenous Student Centre</a> <a href="#">Black Students Advising Centre</a> <a href="#">International Centre</a>
<a href="#">Dalhousie Libraries</a>	Help to find books and articles for assignments Help with citing sources in the text of your paper and preparation of bibliography	<i>Killam Library</i> Ground floor Librarian offices	In person: Service Point (Ground floor)  By appointment: Identify your <a href="#">subject librarian</a>

<a href="#">Studying for Success (SFS)</a>	<p>Help to develop essential study skills through small group workshops or one-on-one coaching sessions</p> <p>Match to a tutor for help in course-specific content (for a reasonable fee)</p>	<p><i>Bissett Student Success Centre</i> Rm. 426, 4th floor, Student Union Building (SUB)</p>	<p>To make an appointment:</p> <ul style="list-style-type: none"> <li>- Call (902) 494-3077</li> <li>- email Coordinator at: <a href="mailto:sfs@dal.ca">sfs@dal.ca</a> or</li> <li>- Simply drop in to see us during posted office hours</li> </ul>
<a href="#">Writing Centre</a>	<p>Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster)</p> <ul style="list-style-type: none"> <li>- Learn to integrate source material into your own work appropriately</li> <li>- Learn about disciplinary writing from a peer or staff member in your field</li> </ul>	<p><b>Killam Library Ground floor</b> Learning Commons &amp; Rm G25</p>	<p>To make an appointment:</p> <ul style="list-style-type: none"> <li>- Visit the Centre (Rm G40C) and book an appointment</li> <li>- Call (902) 494-1963</li> <li>- email: <a href="mailto:writingcentre@dal.ca">writingcentre@dal.ca</a></li> <li>- <a href="#">Book online</a></li> </ul> <p>We are open six days a week</p>

**Other supports and services**

[Student Health & Wellness Centre](#)

[Student Advocacy](#)

[Ombudsperson](#)

**Safety**

[Biosafety](#)

[Chemical Safety](#)

[Radiation Safety](#)

[Scent-Free Program](#)

PRINT AND HANG ON YOUR BULLETIN BOARD

<b>ENVS 3400: ENVIRONMENT AND HUMAN HEALTH - IMPORTANT DATES</b>		
Evaluation	Date Distributed	Due Date/Time
Quizzes		
Quiz #1	January 18, 2018	Same day
Quiz #2	January 25, 2018	Same day
Quiz #3	February 8, 2018	Same day
Quiz #4	February 15, 2018	Same day
Quiz #5	March 1, 2018	Same day
Quiz #6	March 8, 2018	Same day
Quiz #7	March 15, 2018	Same day
Quiz #8	March 22, 2018	Same day
Labs		
Lab #1	January 23, 2018	February 5, 2018 @ 16:30
Lab #2	January 30, 2018	February 12, 2018 @ 16:30
Lab #3	February 13, 2018	February 26, 2018 @ 16:30
Lab #4	February 27, 2018	March 12, 2018 @ 16:30
Lab #5	March 6, 2018	March 19, 2018 @ 16:30
Lab #6	March 13, 2018	March 26, 2018 @ 16:30
Final Exam	Date will be available in March <b>(Do not book travel between April 12-26, 2018)</b>	
NOTE: No quiz rewrites will be offered with exception granted to illness. Medical documentation is required and students may either rewrite or reweight remaining quizzes. <u>This course has a "no late lab submission policy"</u> . Given the time allocated to complete the lab any late labs will be given a zero grade. Please submit all labs through the course Brightspace website.		