SYLLABUS: GEOG 308 Global Climate Change

Tuesdays and Thursdays 8:30-9:50am PHY 145
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Office hours: Tuesdays 1:30-3:30pm

SUMMARY COURSE DESCRIPTION
Climate change is a pervasive and challenging phenomenon that can be viewed through a multitude of lenses. A scientific lens, for instance, reveals altered ecosystems and climatic tipping points while the lens of ethics raises the question of the right to develop and influence the well-being of others while doing so. If we assess the problem almost entirely in terms of the technologies that have gotten us here, the solutions to the problem are likewise going to be technological. This framing leaves out the possibility of creative, positive, nuanced visions of the future that may be rooted in deep scientific understanding of earth systems but also capture (or at least begins a conversation about) core human values, such as equity, compassion, innovation, and connection. Furthermore, a wider variety of actors are increasingly taking action on climate change, or bear some responsibility for doing so, creating challenges for coordinated, effective responses that go beyond international negotiations.

This course is intended for undergraduate students of all backgrounds (arts and sciences) who wish to explore the biophysical and human dimensions of climate change. The course will also help students to hone their abilities to communicate potential solutions to others.

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| (Sept 15 and 17) | • Introduction to the debate  
|             |      • Format and approach of class  
|             |      • Learning objectives, syllabus, schedule  
|             |      • The media, climate change communication, and recent trends                           |             |
| WEEK 2     | INTRODUCTION TO THE CLIMATE SYSTEM                                                          |             |
| (Sept 22 and 24) | • What is a system?  
|             |      • System dynamics  
|             |      • Energy basics                                                                   |             |
| WEEK 3 (Sept 29 and Oct 1) | THE EARTH AND ENERGY  
- Ins and Outs  
- Reflectivity |
|---------------------------|--------------------------------------------------|
| WEEK 4 (Oct 6 and 8)      | THE CARBON CYCLE  
- The Greenhouse Effect  
- Carbon stocks and flows |
|---------------------------|--------------------------------------------------|
| WEEK 5 (Oct 13 and 15)    | CLIMATE MODELS AND PROJECTIONS  
- Dr. Chris Fletcher (TBC) |
|---------------------------|--------------------------------------------------|

**PART II IMPACTS and ADAPTATION**

| WEEK 6 (Oct 20 and 22) | IMPACTS Part 1: Impacts on aquatic and terrestrial systems  
- Aquatic systems  
- Terrestrial systems | In class Test 1: October 22 (includes material from Week 1-6) |
|------------------------|--------------------------------------------------|--------------------------------------------------|
| WEEK 7 (Oct 27 and 29) | IMPACTS Part 2: Impacts on humans  
- Introduction  
- Developing countries  
- Cities  
- In-class review for Test 1 on October 27th |
|------------------------|--------------------------------------------------|--------------------------------------------------|
| WEEK 8 (Nov 3 and 5)   | ASSESSING VULNERABILITY  
- Impact and vulnerability analyses  
- Equity, ethics, responsibility  
- In-class introduction to Assignment 1 on November 5th |
|------------------------|--------------------------------------------------|--------------------------------------------------|
| WEEK 9 (Nov 10 and 12) | ADAPTATION  
- What is adaptation? Reactive, proactive  
- Options and progress  
- Developing country context  
- In-class introduction to TERM Paper on November 12th |
|------------------------|--------------------------------------------------|--------------------------------------------------|

**PART III MITIGATION AND TRANSFORMATION**

| WEEK 10 (Nov 17 and 19) | INTRODUCTION TO MITIGATION  
- Sources of emissions  
- Demand-side mitigation  
- Supply-side mitigation | Assignment 1 Climate change impacts and adaptation options in a Canadian community DUE Nov 17 |
ASSIGNMENTS and GRADING SCHEME

Assignment 1: Climate change in a Canadian community (20%)

Assignment 2: TERM PAPER (30%)

In-class Test #1: 25% Material from Weeks 1-6 inclusive

In-class Test #2: 25% Material from Weeks 7-11 inclusive

A 5000-word term paper on one of the three topics below, typed, is due on December 14th by 5pm via LEARN. You must provide a word count on the cover sheet. (A computer count is fine.) Do not include endnotes or footnotes or references in the overall word count. The minimum word count allowed is 4500. The maximum allowed is 6000. Reports that fall outside of these word limits or do not provide an accurate word count will lose 5 percent. Late submission of written work will also result in a deduction of 5 percent per day. IN ALL CASES, you must keep a copy of your report.

READINGS AND SUPPLEMENTARY REFERENCES
(Please note that readings may shift throughout the term. Regularly check the syllabus on LEARN to stay up to date).


Additional course reference material will be available from several sources:
- Journal articles available through the University of Waterloo library system (many available on LEARN)
- Source websites (urls provided, eg. IPCC).
- The UW-LEARN system will be used to provide any readings that are in addition to the textbook, and will also house the most current version of this syllabus.
WEEK 1: Course introduction
Burch and Harris, Chapter 1: Climate Change in the Public Sphere


WEEK 2: Introduction to the climate system
Burch and Harris, Chapter 2: Basic System Dynamics

WEEK 3: The earth and energy
Burch and Harris:
• Chapter 3 Climate Controls: Energy from the Sun
• Chapter 4 Climate Controls: Earth's Reflectivity

WEEK 4: The greenhouse effects and the carbon cycle
Burch and Harris Chapter 5 Climate controls: the Greenhouse Effect

WEEK 5: Climate models and projections
Burch and Harris Chapter 7 Climate Models p 168-189
Burch and Harris Chapter 8 Future Climate: Emissions, Climatic Shifts, and What to do about them

WEEK 6: Impacts Part 1: Aquatic and terrestrial systems
Burch and Harris Chapter 9: Impacts of climate change on natural systems

WEEK 7: Impacts Part 2: Human systems
Burch and Harris Chapter 10 p 237-250

WEEK 8: Assessing Vulnerability
TBD

WEEK 9: Adaptation
Burch and Harris:
• Chapter 9 p 226-236
• Chapter 10 p 250-259

WEEK 10: Mitigation
Burch and Harris Chapter 6

WEEK 11: Policy, governance and politics


WEEK 12: Transformation
Burch and Harris Chapter 11 Understanding climate change: Pathways forward


Course Policies

Exceptions and Assistance: The University accommodates students with disabilities who have registered with the AccessAbility office. Furthermore, the University has many resources to help students who are in need of assistance for any number of reasons: along with the AccessAbility office, there are also many academic resources, health and counseling services, and peer support systems. If you are struggling (or anticipate needing help) with your coursework for academic and/or personal reasons, please seek the support you need, as early as possible. If you do not know the options, please ask.

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. [Check www.uwaterloo.ca/academicintegrity/ for more information.]

Discipline: A student is expected to know what constitutes academic integrity [check www.uwaterloo.ca/academicintegrity/] 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: 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.

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. Read Policy 70, Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt please be certain to contact the department’s administrative assistant who will provide further assistance.