



**Faculty of Science Course Syllabus (Section A)**  
**Department of Physics & Atmospheric Science**  
PHYC/OCEA/GEOG 2800 – CRN 12617/12478/11348  
Climate Change  
Fall 2022

***Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.***

***We acknowledge the histories, contributions, and legacies of the African Nova Scotian people and communities who have been here for over 400 years.***

<b>Instructor(s):</b>	Manuel Helbig	manuel.helbig@dal.ca
<b>Office Hours:</b>	Please email me to arrange an appointment on Teams or in-person	
<b>Lectures:</b>	MWF 12:35 to 13:25 in LSC242 starting Sept 7, 2022	
<b>Laboratories:</b>	None	
<b>Tutorials:</b>	None	
<b>Course delivery:</b>	In-person (lectures can be recorded upon individual requests)	

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### **Course Description**

The workings of the Earth's climate system are examined and then applied to help understand contemporary climate change. The role of numerical climate models is discussed with the aim of interpreting climate change predictions for the coming decades. Finally, the impacts of climate change are studied with a focus on the various mitigation and adaptation strategies needed.

### **Course Prerequisites**

None. The science needed to understand climate change will be presented in the lectures.

### **Course Exclusion**

ECON2850, PHYC2850

### **Learning Objectives**

- Understand the basic science explaining the causes of climate change
- Understand and interpret climate predictions and their impacts
- Understand climate mitigation and adaptation pathways
- Understand relevance of uncertainty quantification for climate policy support

## Course Materials

- *Suggested textbook*
  - o *Introduction to Modern Climate Change by Andrew E. Dessler, 3<sup>rd</sup> Edition Cambridge University Press, 2022, ISBN 978-1-108-79387-2*
  - o *IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, In press, doi:10.1017/9781009157896. (available online: <https://www.ipcc.ch/report/ar6/wg1/>)*
  
- *All other course material is on the Brightspace course website*

## Course Assessment

<b>Assessment</b>	<b>Weight (% of final grade)</b>	<b>Date</b>
<b>8 Assignments</b>	40% (each 5%)	<i>Due: Wed Sep 21, 28, Oct 5, 12, 26, Nov 2, 16, 23</i>
<b>Midterm exam</b>	20 %	<i>Wed Oct 19 in class</i>
<b>Final exam</b>	40%	<i>Scheduled by Registrar during exam period</i>

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

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

## Course Policies on Missed or Late Academic Requirements

No make-up dates for midterm and final exam.

Late Assignments will lose 10% of value per day.

If the midterm is missed for health reasons (Student Declaration of Absence Form is required) only the final exam will count for 60% of the final grade.

## Course Policies related to Academic Integrity

All submitted work must be done by individual students without collaboration.

Where possible, plagiarism software will be used to identify cases of copying work from uncited sources.

**Course Content (Tentative)**

1. Evidence of climate change
2. Atmospheric composition & anthropogenic impacts
3. Radiation
4. Earth's energy balance
5. Greenhouse gases and recent climate change
6. Hydrological cycle
7. Clouds & aerosols
8. Carbon budget
9. Climate feedbacks
10. Climate models & climate sensitivity
11. Climate mitigation policies
12. Climate scenarios
13. Climate policy & uncertainty

**Faculty of Science Course Syllabus (Section B)  
Fall/Winter 2022-23**

PHYC/OCEA/GEOG 2800 – CRN 12617/12478/11348

Please ensure that the following information on University Policies is available to all students in your course. This document should be sent to students in your course along with your Course Syllabus, Section A, or may be copied into your Course Syllabus (Section A).

## **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](mailto: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://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&chapterid=-1&topicgroupid=31821&loaduseredits=False>

### **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)