COURSE OVERVIEW
This course will introduce climate change, its drivers, impacts, and policies to address these. Climate change will be contextualized within global change, and the interplay of socio-economic development and technical change with climate policies. This course is about understanding the complexity of these interactions and identifying policy responses that are more likely to succeed. Changes in global climate will have a range of impacts across different geographies, ecosystems, and societies. Some will benefit while others will face devastation. The challenge lies in finding solutions that address this diversity of outcomes without thwarting the rights of different peoples to “develop”.

PREREQUISITES
Undergraduate course in environmental science or physical geography, or with permission of instructor.

LEARNING OUTCOMES
By the end of the course, students will be able to:
1. Explain basic scientific and economic concepts related to climate policy;
2. Critically read papers and synthesize key contributions and remaining questions;
3. Analyze and describe key policy debates and their technical, economic, political, social, and/or ethical underpinnings;
4. Critically evaluate the technical, economic, and socio-political opportunities and challenges associated with implementing different climate solutions.

ASSESSMENT
You will be assessed on the following criteria:
• Plagiarism tutorial and test [5%; individual grade]
• Paper presentation [10%; individual grade]
• Discussion contribution and class participation [10%; individual grade]
• Short writing assignments (n=5) [5 x 10% = 50%; group grade with individual variations]
• Term project [25%; group grade with individual variations]
GPP58/RES 520
Climate Change: Science, Technology and Sustainable Development
Room 107/108 AERL building; Term 1, Tues 9-12 am

LEARNING OUTCOMES, ASSESSMENT & TEACHING/LEARNING STRATEGIES

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Assessment</th>
<th>Teaching and Learning Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain basic scientific and economic concepts related to climate policy</td>
<td>• Assignments</td>
<td>• Lectures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Assigning readings and facilitating discussion</td>
</tr>
<tr>
<td>Critically read papers and synthesize key contributions and remaining questions;</td>
<td>• Leading paper discussions</td>
<td>• Assigning readings and facilitating discussion</td>
</tr>
<tr>
<td>Analyze and describe key policy debates and their technical, economic, political, social, and/or ethical underpinnings;</td>
<td>• Evaluation of discussion contributions</td>
<td></td>
</tr>
<tr>
<td>Critically evaluate the technical, economic, and socio-political opportunities and challenges associated with implementing different climate solutions.</td>
<td>• Term project evaluation</td>
<td>• Helping students design and conduct term project research</td>
</tr>
</tbody>
</table>

COURSE ACTIVITIES

1) Paper presentation
Each student will be asked to review and present one of the suggested readings for the course. You are expected to summarize the paper and critique its findings. The presentation should take no longer than 20 minutes and will be followed by a 10 minute Q&A session. Resources for how to present papers are here (http://web.stanford.edu/~jacksonm/present.pdf) and here (http://www.cs.rpi.edu/courses/spring99/robotics/paperdiss.html).

Role of discussion leader
• Give a short (2-3 min) overview of the paper (key questions, methods, findings).
• Present 2 questions for the class to discuss.
• Summarize the key points learnt from the discussion.

Grading. See rubric at the back for guidance on how this will be assessed.

2) Reading and discussing journal articles each week
Each week, you will read 2 assigned papers. [One of you will be responsible for preparing and leading the discussion of each paper each week, as described above]. This is a graduate seminar course, and the spirit is to have student-led learning. The success of this course depends on regular attendance and engagement in class. Learning occurs through discussing ideas with your peers, as facilitated by the course instructor.

Format for paper discussions
• Discussion leader will give a short (2-3 min) overview of the paper (key questions, methods, findings).
• Next, the discussion leader will present 2 questions for the class to discuss. Open discussion at this point [I might intervene to reframe the questions or ask them differently, depending on how the discussion goes].
• Finally, the discussion leader will summarize the key points learnt from the discussion.
Ground rules (from NWABR and Ryerson University Teaching & Learning Office)

- Do not expect everyone to speak every time
- Not expected to “perform”, but rather, share opinions and observations
- Don’t be afraid to be stupid; will not grade everything you say”
- Listen carefully
- Address one another respectfully
- Clarify if a comment is your opinion, or based on a paper or other evidence
- Address comments to the group (no side conversations)
- Use sensitivity to take turns and not interrupt others
- Be courageous in presenting your own thoughts and reasoning, but be flexible and willing to change your mind in the face of new and compelling evidence

Grading. Preliminary grades may be given during the course of the semester. See rubric at the back for guidance on how this will be assessed.

3) Assignments
You will work on 5 short assignments (~1000 words) during the course of the semester. See tentative assignment due dates in course calendar (but potentially subject to change, so dates on handed assignment will be the final ones). You will work in groups to complete these assignments.

Grading. Criteria for evaluation of your work will be provided along with each assignment.

4) Term project
Your term project will research a solution for climate change, covering the science, technological, economic, and socio-political opportunities and challenges. You will work in groups students to do your research.

Grading. Criteria for evaluation of your work will be provided along with the term project instructions.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic/Question for the week</th>
<th>9:00-10:00</th>
<th>10:15-10:45</th>
<th>10:45-11:15</th>
<th>11:30-Noon</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sep 03</td>
<td>Overview of the course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sep 10</td>
<td>Climate science 1 (Theory &amp; Observations); Assignment 1 handed out</td>
<td>Lecture</td>
<td>Paper 1</td>
<td>Paper 2</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>3</td>
<td>Sep 17</td>
<td>Climate science 2 (Drivers; Carbon cycling)</td>
<td>Lecture</td>
<td>Paper 3</td>
<td>Paper 4</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>4</td>
<td>Sep 24</td>
<td>Climate science 3 (Climate models &amp; simulations; Human fingerprint); Assignment 1 due; Assignment 2 handed out</td>
<td>Lecture</td>
<td>Paper 5</td>
<td>Paper 6</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>5</td>
<td>Oct 01</td>
<td>Climate science 4 (Impacts)</td>
<td>Lecture</td>
<td>Paper 7</td>
<td>Paper 8</td>
<td>Q&amp;A</td>
</tr>
<tr>
<td>6</td>
<td>Oct 08</td>
<td>Play &quot;Keep it cool&quot; game; Assignment 2 due; Assignment 3 handed out</td>
<td></td>
<td></td>
<td></td>
<td>Project work</td>
</tr>
<tr>
<td>7</td>
<td>Oct 15</td>
<td>Climate ethics &amp; equity (Why do we need to act?)</td>
<td>Lecture</td>
<td>Paper 9</td>
<td>Paper 10</td>
<td>Project work</td>
</tr>
<tr>
<td>8</td>
<td>Oct 22</td>
<td>Climate solutions 1: energy supply and energy use; Assignment 3 due; Assignment 4 handed out</td>
<td>Lecture</td>
<td>Paper 11</td>
<td>Paper 12</td>
<td>Project work</td>
</tr>
<tr>
<td>9</td>
<td>Oct 29</td>
<td>Climate solutions 2: economics (carbon price; climate finance)</td>
<td>Lecture</td>
<td>Paper 13</td>
<td>Paper 14</td>
<td>Project work</td>
</tr>
<tr>
<td>10</td>
<td>Nov 05</td>
<td>Climate solutions 3: behavioral &amp; political action; Assignment 4 due; Assignment 5 handed out</td>
<td>Lecture</td>
<td>Paper 15</td>
<td>Paper 16</td>
<td>Project work</td>
</tr>
<tr>
<td>11</td>
<td>Nov 12</td>
<td>Climate solutions 4: adaptation, geo-engineering</td>
<td>Lecture</td>
<td>Paper 17</td>
<td>Paper 18</td>
<td>Project work</td>
</tr>
<tr>
<td>12</td>
<td>Nov 19</td>
<td>Climate solutions 5: policy and international negotiations; Assignment 5 due</td>
<td>Lecture</td>
<td>Paper 19</td>
<td>Paper 20</td>
<td>Project work</td>
</tr>
<tr>
<td>13</td>
<td>Nov 26</td>
<td>Student presentations of term project</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Course drop deadline:** Sept 17.
READINGS [preliminary list subject to change]

Global environmental change

Science

Impacts

Economics

Policy and politics

Solutions


**Adaptation**


**Ethics**

GRADING RUBRICS

Rubric for assessing paper presentations by discussion leaders

<table>
<thead>
<tr>
<th>Points</th>
<th>Presenting paper overview</th>
<th>Designing 2 questions for class discussion</th>
<th>Summarizing key discussion learning outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td>2</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>1</td>
<td>Fair</td>
<td>Fair</td>
<td>Fair</td>
</tr>
<tr>
<td>0</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
</tr>
</tbody>
</table>

Extra point for going beyond expectations

Rubric for assessing discussion and class participation contribution (modified from Anderson & Speck 1998)

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-10</td>
<td>Comes to class prepared; contributes readily to the conversation but doesn’t dominate it: makes thoughtful contributions that advance the conversation; shows interest in and respect for others’ views; participates actively in small groups. Score of 10 is reserved for truly exceptional students.</td>
</tr>
<tr>
<td>8</td>
<td>Comes to class prepared and makes thoughtful comments when called upon, contributes occasionally without prompting: shows interest in and respect for others’ views; participates actively in small groups. A 8.0 score may also be appropriate to an active participant whose contributions are less developed or cogent than those of a 9/10 but still advance the conversation.</td>
</tr>
<tr>
<td>7</td>
<td>Comes to class prepared, but does not voluntarily contribute to discussions and gives only minimal answers when called upon. Nevertheless these students show interest in the discussion, listen attentively, and take notes. Students in this category may be shy or introverted. The instructor may choose to give such students a 8.0 if they participate fully in small group discussions or if they make progress in overcoming shyness as the course progresses.</td>
</tr>
<tr>
<td>6</td>
<td>Participates in discussion, but in a problematic way. Such students may talk too much, make rambling or tangential contributions, continually interrupt the instructor with digressive questions, bluff their way when unprepared, or otherwise dominate discussions, not acknowledging cues of annoyance from instructor or students. Students in this category often profit from a conference with the instructor.</td>
</tr>
<tr>
<td>4-5</td>
<td>Students in this range often seem on the margins of the class and may have a negative effect on the participation of others. Students receiving a 5 often don’t participate because they haven’t read the material or done the homework. Students receiving a 4 may be actually disruptive, radiating negative energy via hostile or bored body language, or be overtly rude.</td>
</tr>
<tr>
<td>0</td>
<td>Did not attend class (no permission sought to miss class)</td>
</tr>
</tbody>
</table>

Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you must not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President’s Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences. A more detailed description of academic integrity, including the University’s policies and procedures, may be found in the Academic Calendar at http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0.
Plagiarism
Plagiarism, which is intellectual theft, occurs where an individual submits or presents the oral or written work of another person as his or her own. Scholarship quite properly rests upon examining and referring to the thoughts and writings of others. However, when another person's words (i.e. phrases, sentences, or paragraphs), ideas, or entire works are used, the author must be acknowledged in the text, in footnotes, in endnotes, or in another accepted form of academic citation. Where direct quotations are made, they must be clearly delineated (for example, within quotation marks or separately indented). Failure to provide proper attribution is plagiarism because it represents someone else's work as one's own. Plagiarism should not occur in submitted drafts or final works. A student who seeks assistance from a tutor or other scholastic aids must ensure that the work submitted is the student's own. Students are responsible for ensuring that any work submitted does not constitute plagiarism. Students who are in any doubt as to what constitutes plagiarism should consult their instructor before handing in any assignments.

http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,959

Access & Diversity
Access & Diversity works with the university to create an inclusive living and learning environment in which all students can thrive. The university accommodates students with disabilities who have registered with the Access & Diversity unit: [http://www.students.ubc.ca/access/drc.cfm]. Students must register with the Disability Resource Centre to be granted special accommodations for any on-going conditions.

Religious Accommodation
The university accommodates students whose religious obligations conflict with attendance, submitting assignments, or completing scheduled tests and examinations. Students should let their instructor know in advance, preferably in the first week of class, if they will require any accommodation on these grounds. Students who plan to be absent for varsity athletics, family obligations, or other similar commitments, cannot assume they will be accommodated, and should discuss their commitments with the instructor before the course drop date. UBC policy on Religious Holidays: http://www.universitycounsel.ubc.ca/policies/policy65.pdf

UBC Statement on Respectful Environment for Students, Faculty and Staff
The University of British Columbia envisions a climate in which students, faculty and staff are provided with the best possible conditions for learning, researching and working, including an environment that is dedicated to excellence, equity and mutual respect. The University of British Columbia strives to realize this vision by establishing employment and educational practices that respect the dignity of individuals and make it possible for everyone to live, work, and study in a positive and supportive environment, free from harmful behaviours such as bullying and harassment.