

Geography 459: Energy & Sustainability - Course Outline S18

Weekly classes – Tuesdays 11:30 -14:20 EV2-2002

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Instructor Office Hours – EV1-356 Mondays 14:30-16:30; Tuesdays 14:30-15:30

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Teaching Assistant Office Hours – EV1-356 Thursdays 10:00-11:00am or by appointment

Course Description

The major global energy systems: coal, oil, gas, nuclear, wind, solar and other renewables are examined. The distribution of energy resources and changing consumption patterns are reviewed. International comparisons will be made and the environmental impacts of different energy systems studied. Global climate change, its connection to energy consumption and more sustainable future options are explored. Energy systems, their influencing factors and policy options at multiple scales will be reviewed and examined.

Lecture and Assignment Schedule

Week	Lecture Topic	Assignment
1	Course Overview / Primary Energy	<i>Alternative assignment 3: Applications due end of week</i>
2	Energy Trends & Canada's Energy Landscapes	<i>In-class activity: bring computer to class</i>
3	Building Envelop	<i>Bring assignment 1 draft to class Deadline to select assignment 2 groups & house</i>
4	Residential Energy Systems	1. National energy & climate strategy - due(20%)
5	Electricity	
6	Community Energy Planning Costs and Community GHG Inventories	
7	Conservation Options for Residential Energy Systems	2. Household energy presentation & assignments due (25%) <i>Deadline to select groups/individual option for assignment 3</i>
8	Coal/Oil and Gas	
9	Hydro, Solar, Wind & Tidal	
10	Net Zero Energy Communities	3. Net-zero energy project presentation & assignments due (25%)
11	Nuclear, Aviation	
12	Energy Access & Remote Communities	
13	The Future of Energy Systems & Exam Review	<i>Alternative Assignment 3 Report Due (25%)</i>

Course information and assignment descriptions are posted on LEARN.

Learning objectives

1. To recognize and describe the source, conversion and use of fossil fuel, nuclear and renewable energy sources.
2. To outline and analyze the carbon intensity of various energy systems
3. To examine major Canadian and global energy systems and their components
4. To analyze and evaluate existing energy policies and programs at micro and macro scales (e.g., national, community and household levels).
5. To develop skills to measure energy performance and to evaluate options for improvements in energy efficiency and carbon intensity at multiple scales.
6. To develop national energy policy recommendations
7. To design a net zero home
8. To evaluate and create a community energy plan

Readings

Required Texts: B. Everett, G. Boyle, S. Peake, J. Ramage 2012 *Energy Systems and Sustainability*. Oxford: Oxford University Press.

Natural Resources Canada. *Keeping the Heat In*. Ottawa

<http://www.oeo.nrcan.gc.ca/residential/personal/heat/keeping-heat-in-toc.cfm>

No single text covers all the material. Students are encouraged to read widely, starting with the readings and web sites listed on the LEARN course site.

Evaluation

Final grades for the course will be based on:

1. **National energy & climate strategy individual assignment (20%);** due Tuesday week 4, 11:30am
2. **Residential energy conservation group assignment (25%);** due Tuesday week 7, 11:30am
 - Self-selected groups of 3-4 - Group selection due week 3
3. **Community energy planning assignment (25%);** due Tuesday week 10, 11:30am
 - Individual or self-selected groups of 3-4. Group/individual selection due week 7
 - *Or alternative 3rd assignment (details below)
4. **Final Exam (30%) during exam period**

Alternative 3rd Assignment: Community Experiential Learning (25%)

Instead of preparing a net-zero energy plan for the community, a few students can work with REEP Green Solutions and report on those activities.

Evaluation & timelines

- How much time am I expected to contribute? 40 hours (e.g. 4 hrs x 10 weeks) May-July
- Apply to jobs – Due end of Week 1
- Final report (25%) – Due week 13

What is the REEP House? "Kitchener's REEP House for Sustainable Living is your hands-on showroom offering "one-stop-shopping" for green living ideas, from the newest sunlight balanced LED lighting for your kitchen to solar panels and permeable paving! **Tour this Century brick home** and learn how we found heritage style wood-framed arch-top stained glass windows that are R-7, gorgeous 100 year old recycled flooring, and super insulation (<http://reepgreen.ca/homeenergy101/>). Use our modeling software to determine the cost, payback and energy savings of green options for your home, and to hook up with suppliers, contractors, grants and financing! http://www.reepwaterlooregion.ca/prog_house.php

Submission & Late Penalties

All assignments are to be submitted by the due date on Learn and as a hard copy

Penalties of 10% per day apply for assignments submitted late

University Requirements

Academic Integrity: To maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. The University's guiding principles on academic integrity can be found here: <http://uwaterloo.ca/academicintegrity>. ENV students are strongly encouraged to review the material provided by the university's Academic Integrity office specifically for students: <http://uwaterloo.ca/academicintegrity/Students/index.html>

Discipline: Students are also expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for their actions. Students who are unsure whether an action constitutes an offense, or who need help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. Students may also complete the following tutorial <https://uwaterloo.ca/library/get-assignment-and-research-help/academicintegrity/academic-integrity-tutorial>. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline (<https://uwaterloo.ca/secretariat-general-counsel/policiesprocedures-guidelines/policy-71>). Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance (<https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70>).

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. See Policy 70 - Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70. When in doubt please contact your Undergraduate Advisor for details.

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

Unclaimed assignments: Unclaimed assignments will be retained until one month after term grades become official in quest. After that time, they will be destroyed in compliance with UW's confidential shredding procedures.

Turnitin: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, and are subject to the USA PATRIOT ACT, 2001; therefore, students must be given an alternative (e.g., scaffolded assignment or annotated bibliography) if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin® in this course. It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit the alternate assignment.

Communications with Instructor and Teaching Assistants: All communication with students must be through either the student's University of Waterloo email account or via Learn. If a student emails the instructor or TA from a personal account they will be requested to resend the email using their personal University of Waterloo email account.

Recording lectures: Use of recording devices during lectures is only allowed with explicit permission of the instructor of the course. If allowed, video recordings may only include images of the instructor and not fellow classmates. Posting of videos or links to the video to any website, including but not limited to social media sites such as: facebook, twitter, etc., is strictly prohibited.

Intellectual Property: Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as: Lecture content, spoken and written (and any audio/video recording thereof); Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides); Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository). Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights. Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

Note for students with disabilities: AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Mental Health: The University of Waterloo, the Faculty of Environment and our Departments/Schools consider students' well-being to be extremely important. We recognize that throughout the term students may face health challenges - physical and / or emotional. **Please note that help is available.** Mental health is a serious issue for everyone and can affect your ability to do your best work. Counselling Services (<http://www.uwaterloo.ca/counselling-services>) is an inclusive, non-judgmental, and confidential space for anyone to seek support. They offer confidential counselling for a variety of areas including anxiety, stress management, depression, grief, substance use, sexuality, relationship issues, and much more.

Religious Observances: Students need to inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

Co-op interviews and class attendance: Co-op students are encouraged to try and choose interview time slots that result in the least amount of disruption to class schedules. When this is challenging, or not possible, a student may miss a portion of a class meeting for an interview. Instructors are asked for leniency in these situations; but, a co-op interview does not relieve the student of any requirements associated with that class meeting. When a co-op interview conflicts with an in-class evaluation mechanism (e.g., test, quiz, presentation, critique), class attendance takes precedence and the onus is on the student to reschedule the interview. CECA provides an interview conflict procedure to manage these situations. Students will be required to provide copies of their interview schedules (they may be printed from WaterlooWorks) should there be a need to verify class absence due to co-op interviews.