

ENV262H1 L0101

The Science of Energy in the Environment

Fall 2017

Energy is one of the most fundamental organizing principles of Nature as well as being a key concept in technology. Every physical, chemical and biological process crucially involves the transformation of energy. Einstein taught us that even matter is a form of energy. Energy is important to our understanding of the origin and evolution of the universe, as well as being the basis of Earth's ecosystems, of technology and of the global economy. This course will explore the science of energy, and the related concept entropy, in all its forms. The historical evolution of energy technology leading to the present confrontation between energy production and climate will be considered.

This is **non-Science**, 200-level **breadth** course primarily aimed at Arts and Humanities students in either School of the Environment programs or in the Faculty of Arts and Science.

Class time and location: Fridays, 10am -12am, BA1160 (*subject to change*)

Tutorials: T0101: Fridays 12 noon – 1 pm, room TBA

T0102: Fridays 1pm – 2 pm, room TBA

At the end of this course, students should be able to:

- **Show understanding** of a wide range of scientific energy concepts.
- **explain** how changes in energy underlie all aspects of the natural world, as well as key energy technologies.
- **compare** different types of energy technologies and how they appear in different social contexts through history.
- **reflect** on the implications of emerging challenges in energy technology and the importance of sustainable energy to the future of humanity.

Instructors: **Stephen Morris** (Physics)
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Guest Lecturers: **Ben Akrigg** (Classics)
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Teaching Assistant: **Deepak Chandan** (Physics)
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Course Assessment:

One 2 hour in-class mid-term test on Oct, 20 th	25%
2 Short writing assignments Due: Oct 6 th , Nov 24 th	2 x 10%
Tutorial attendance & participation	15%
Final Examination	40%

Some further notes on course requirements:

- The midterm test will be held in class on Friday October 20th. The test will cover the material from the preceding six weeks of the course, including guest lectures, readings and class notes *etc.*, and will require short answers.
- Final exams are scheduled by the Faculty of Arts and Science. The exam period for this semester runs from 9th to 20th December. The exam timetable will be published in October. The final exam will include both short-answer sections similar to the midterm test and a short essay section.
- Attendance is required at all lecture and tutorial sessions. You will be expected to have completed assigned readings or other preparation: this will be announced each week in class and posted on Blackboard.
- **Students who miss the midterm will receive a mark of zero for that test.**
However, if the test was missed for reasons **entirely** beyond your control you should, **within one week of the missed midterm**, submit to the instructor a written request for special consideration explaining your reason for missing the test, and attaching appropriate documentation, such as a medical certificate or a College Registrar's note. If your reason for missing the test is acceptable, then your mark will be proportionally redistributed over the other marked parts of the course.

Lecture schedule: (*subject to change on the fly*)

8 th Sept:	Introduction: what is energy?
15 th Sept:	Energy in all its forms
22 nd Sept:	guest lecturer Ben Akrigg: Energy in agrarian civilizations
29 th Sept:	guest lecturer Ben Akrigg: Triremes and catapults
6 th Oct:	Energy and heat engines
13 th Oct:	Energy and entropy
20 th Oct:	midterm test in class
27 th Oct:	Electrical energy
3 rd Nov.	Renewable energy sources
6 th Nov.	<i>Last day to drop F courses without academic penalty</i>
10 th Nov.	<i>No class: Fall study break</i>
17 th Nov.	guest lecturer Adonis Yatchew: Energy economics in the modern world
24 th Nov.	Nuclear energy in war and peace
1 st Dec.	guest lecturer Adonis Yatchew: Security, sustainability and the future

Recommended Reading: V. Smil's *Energy: A Beginner's Guide* (Oneworld, Oxford 2006). We will not follow this book closely, but it provides useful background reading for this course.

Additional readings and links will be provided in class or via Blackboard.

Accessibility Needs:

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible.

email: accessibility.services@utoronto.ca

or visit: <https://www.studentlife.utoronto.ca/as>.

Academic Integrity:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (www.governingcouncil.utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

1. Using someone else's ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course without the permission of the instructor.
3. Making up sources or facts.
4. Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

1. Using or possessing unauthorized aids.
2. Looking at someone else's answers during an exam or test.
3. Misrepresenting your identity.

In academic work:

1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources.

See <http://www.artsci.utoronto.ca/osai/students>