GEOG/ENST 3431, Winter 2019

ENERGY AND SUSTAINABILITY

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Course Content:

Energy is a keystone to human society; its availability has a powerful influence on the way we live our lives. The goal of this course is to illuminate how and why we make use of the energy sources available to us, and to appreciate the consequences that our energy use has on the environment around us. In addition to reviewing the basic terms and concepts required to understand energy on a physical basis, the course will examine the nature of world energy resources and the changing patterns of their distribution, production and consumption.

Textbook:

Everett, R., G. Boyle, S. Peake, and J. Ramage (2012). *Energy Systems and Sustainability: Power for a Sustainable Future, 2nd Edition* (Oxford University Press).

Evaluation Scheme:

Exercises	10%	Quasi-weekly
Midterm	25%	February 14
Project	15%	April 4
Final Examination	50%	TBA

The course includes take-home exercises which will be submitted **in class** and then discussed. Completing them will be worth 10% of the final grade. Late submissions will **not** be accepted.
The discussion and paper constitute an independent project described in the syllabus.

Lecture Times and Place:

Tuesdays and Thursdays: 8:30 – 10:00 (RB 1021)

Lecture Schedule, Winter 2019 (*subject to changes)*

Dates	*Tuesday*	*Thursday*
January 8 and 10	Introduction	Primary Energy
January 15 and 17	Energy Services	Forms of Energy
January 22 and 24	Coal	Heat Engines
January 29 and 31	Oil and Gas	Other Fossil Fuels
February 5 and 7	Transportation	Electricity
February 12 and 14	Electricity Generation	**MIDTERM**
February 19 and 21	**READING WEEK**	
February 26 and 28	Nuclear Energy	Nuclear Generation
March 5 and 7	Nuclear Waste	Pollution
March 12 and 14	Mitigation	Global Problems
March 19 and 21	Global Remedies	Hydro and Wind
March 26 and 28	Solar	Biomass and Geothermal
April 2 and 4	Energy Markets	Summary

Individual Projects, Winter 2019

Note: the details of this project, including the proposed spreadsheet, are still being finalized

Background
A 'carbon tax' is likely to be a major political issue in the forthcoming Canadian election. The purpose of a carbon tax is to alter consumer behaviour in a way that reduces the emission of greenhouse gases, chiefly carbon dioxide. The rate of taxation will need to be high to accomplish its goals, but will have other impacts on consumers.

Calculations
The basis for each project is a spreadsheet, supplied by the instructor, that includes a standard mix of fuels along with their price and carbon intensity. By adjusting the mixture, students can determine levels that will meet emissions reductions targets, and the resulting change in the price of energy.

Research
You will then conduct research into possibilities for changing parameters such as fuel price, carbon intensity, total energy requirements, distribution costs, etc. Your sources for this must consist of either academic or 'grey' literature (published reports from government agencies or other responsible organizations). Other popular media (including web sites) will not be acceptable; investigate your sources and consult with the instructor if necessary.

Use the spreadsheet to investigate how these options would affect the price of taking an environmentalist perspective to our energy system.

Report
Each student will write a report describing their calculations and results, the research they carried out, and how this affected their conclusions.

While this is a short paper, it should still have a formal style ***with an abstract and a concluding section***. An abstract is a short paragraph that describes the contents and conclusions of your paper. Most likely 3-4 sentences will be sufficient.

Remember to cite your sources within your paper! **Failure to refer to your sources constitutes plagiarism**, regardless of your intent. All papers are to be fully referenced using the author-date style of referencing (e.g., Hanson et al. 2008). If you are unsure, follow the format described in the Department of Geography Undergraduate Thesis Manual, available through the department web site:
https://www.lakeheadu.ca/academics/departments/geography/thesis