

COURSE OUTLINE

COURSE: JGE 348S: CARBON-FREE ENERGY
INSTRUCTOR: Danny Harvey
SSH 5032, Telephone: 978-1588; email: harvey@geog.utoronto.ca
LOCATION: SS2127
TIME Mon 4-6, occasional tutorials Mon (6:10 until 7:00 or longer if needed)
in SS2127 (see schedule on reverse)

Outline

The course examines the options available for providing energy from the major carbon-free energy sources: solar, wind, biomass and nuclear, as well as through sequestration of carbon from fossil fuel sources. For each carbon-free energy source covered, the physical principles, physical or biophysical limits, efficiencies, and other constraining factors are discussed, as well as examples of current applications, current and projected future costs, and possible future scenarios. The course concludes by combining the main conclusions from JGE 347F concerning the prospects for reducing energy demand through improved energy efficiency, with the conclusions drawn in this course concerning the feasibility of large-scale carbon-free energy, to generate scenarios of future greenhouse gas emissions, showing the range of possible consequences for global mean temperature, sea level rise, and ocean acidification.

Text

The course text is my own book, *Energy and the New Reality, Volume 2: C-Free Energy Supply* (Earthscan, April 2010), and is available in the university bookstore. Powerpoint files for each chapter are available on my website (<http://faculty.geog.utoronto.ca/Harvey/Harvey/publications.htm#pub>) (only the chapters indicated in the outline are needed)

Requirements

There will be 2 major computational assignments to give students a hands-on feel for the subject matter and to develop quantitative skills in a progressive manner. The assignments will involve using Excel spreadsheets. The assignments will be worth 25% each, and thus worth 50% of the final mark in total.

There will be one mid-term test and a 2-hour exam (with the exam covering only the second half of the term work). The term test and exam will each be worth 25% of the final mark.

Penalty for late work:

5% per weekday. No marks will be given after an assignment is taken up in class, which is usually one week after it is due, so plan your work carefully.

If you miss term test: Notify me **within 24 hours** and present medical documentation. Only cases of severe illness or other extreme situations will be accepted.

Pre-requisite: JGE 347F or permission of instructor.

Exclusion: GGR 333

**JGE 348S – Carbon-Free Energy
OUTLINE OF LECTURES**

Week Number	Topic	Winter 2011 Date
1	Wind	10 Jan
2	Wind	17 Jan
3	Biomass	24 Jan
4	Biomass	31 Jan
5	Biomass	7 Feb
6	Guest Lecture	14 Feb
7	Term Test	28 Feb
8	Solar	7 March
9	Solar	14 March
10	Nuclear	21 March
11	Carbon sequestration	28 March
12	Scenarios	4 April

JGE 348F - PROBLEM SETS

PS #	Topic	Assigned	Due	Taken Up	% Contribution to final mark
1	Wind energy	17 Jan	7 February, in class	14 Feb	25
2	Solar energy	7 Mar	28 March, in class	4 Apr	25

JGE 348F – DATES OF MONDAY TUTORIALS (in SS2110)

Date	Activity
17 January	Hand out PS#1, explain first part
31 January	Explain second part of PS#1, answer questions on work in progress. Note: questions on the first part of PS#1 will not be answered after this date, so this date serves as a deadline for getting the first part largely finished.
14 Feb	Take up PS#1, answer questions about upcoming term test
7 March	Take up term test, hand out PS#2, explain first part
21 March	Explain second part of PS#2, answer questions on work in progress. Note: questions on the first part of PS#2 will not be answered after this date, so this date serves as a deadline for getting the first part largely finished.
4 April	Take up PS#2