

COURSE: JPG 1407F: EFFICIENT USE OF ENERGY – Fall 2016  
INSTRUCTOR: Danny Harvey  
SS 5032, Telephone: 978-1588; email: harvey@geog.utoronto.ca  
LOCATION: SS 1074  
TIME Wed 5-7, occasional Wed tutorials (6:10 until 7:00, same location) (see schedule on reverse)  
OFFICE HOURS: MF11-1, W11-4 or by appointment

### **Outline**

The course examines the options available for dramatically reducing our use of primary energy with no reduction in meaningful energy services, through more efficient use of energy at the scale of energy-using devices and of entire energy systems. Topics covered include: energy use in buildings, transportation, industry and agriculture. Each topic will cover (i) the underlying physical principles that determine the potential of and the limits to energy efficiency improvements, (ii) the difference in potential savings when focusing on individual energy using devices rather than entire energy-using systems, (iii) examples of efficiency improvements that have been achieved in practice in various countries around the world, and (iv) the cost and financing of energy efficiency improvements. As well, the role of the so-called rebound effect in eroding the energy-saving benefit of efficiency improvements will be discussed.

### **Text**

The course text is my own book, *Energy and the New Reality, Volume 1: Energy Efficiency and the Demand for Energy Services* (Earthscan, March 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). These files are a good starting point for studying the course material but will need to be supplemented with notes from the textbook.

### **Requirements**

There will be a units conversion assignment, 2 major computational assignments and 1 minor computational assignment to give students a hands-on feel for the subject matter and to develop quantitative skills in a progressive manner. The 3 computational assignments will involve using Excel spreadsheets. The assignments will be worth 50% of the final mark in total. As well, additional meetings with graduate students will be held after 2 classes to discuss supplemental readings.

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

### **Penalty for late work:**

5% per weekday.

**Pre-requisite:** Some first-year math and/or physics will be very helpful. *Ontario Grade 11 Physics (or the equivalent from elsewhere) is an absolute minimum pre-requisite.*

**Exclusion:** JPG 1406

**JPG 1407F – Efficient Use of Energy  
OUTLINE OF LECTURES - 2014**

Week Number	Topic (and chapter from textbook)	Fall 2014 Date
1	Introduction (Chapters 1 and 2)	14 Sept
2	Transportation (Chapter 5)	21 Sept
3	Transportation	28 Sept
4	Industry (Chapter 6)	5 Oct
5	Agriculture (Chapter 7)	12 Oct
6	Buildings (Chapter 4)	19 Oct
7	Term Test (Covers weeks 1-5)	26 Oct
8	Buildings	2 Nov
9	Buildings	9 Nov
10	Buildings	16 Nov
11	Buildings	23 Nov
12	Scenarios, Policy (Chapters 10 & 11)	30 Nov

**JPG 1407F - PROBLEM SETS**

PS #	Topic	Assigned	Due	Taken Up	Contribution to final mark
1	Units and energy	14 Sept	28 Sept, in class	5 Oct	4%
2	Transportation	21 Sept	12 Oct, in class	19 Oct	18%
3	Buildings	2 Nov	23 Nov, in class	30 Nov	23%
4	Windows	30 Nov	2 January, 2017		5%

**JPG 1407F – DATES OF MONDAY TUTORIALS AFTER CLASS**

Date	Activity
21 Sept	Hand out and explain PS#2
5 Oct	Meeting to discuss supplemental readings
19 Oct	Take up PS#2
2 Nov	Take up Term test, Hand out PS#3, explain first part
9 Nov	Explain second part of PS#3
16 Nov	Meeting to discuss supplemental readings
30 Nov	Take up PS#3, present supplemental problem set (PS#4)