SYLLABUS

Introduction

Energy has defined development objectives, shaped military strategy and subverted democracy! Its pursuit has led to: the earth gashed, forests felled, rivers dammed and atoms smashed. The majority of the available global energy resources are harnessed to serve the needs of industrialized nations. Meanwhile, basic cooking needs for 2 billion or so people are met by women and children expending hours per day collecting biomass. The former are causing urban air pollution, regional acid rain and global climate change. The latter are unable to work after dark, and suffer daily from indoor air pollution many times worse than those that trigger urban air quality alerts.

This is a two-week crash course focused on understanding the challenges of energy in our society. This course was designed by graduate students through the University of British Columbia (UBC) Bridge Program (www.bridge.ubc.ca) and funded through UBC's Teaching and Learning Enhancement Fund. It is designed to be delivered as part of undergraduate coursework at UBC, aimed to serve 3rd or 4th year undergraduates from virtually any discipline.

Delivery

This course uses WebCT as a vehicle for delivering course readings, assignments, and discussions. The in-class activities will include:

- Brief presentations by the instructors to introduce some basic material or reinforce what you will learn from the readings and exercises.
- In-class discussion of assignment questions.
- Videos, problem solving, and case study discussions

Readings and Assignments

The core learning material for this course is the completion of the assignments (including the in-class discussion) and the associated readings. Assignments are to be completed individually, but discussions outside of class are encouraged. The four assignments are:

1. Introduction to energy: system architecture & rules of the game.
2. Energy & society: what we use & relation to quality of life.
3. Energy impacts: home space heating interactive exercise.
4. Energy futures: options & policy.

There are three basic tasks for each assignment for which you will be marked:

a. Multiple choice, true/false, or short answer questions.
b. Post your comments in the WebCT online Discussion folder, following the specific word limits specified in each assignment.
c. Come to class prepared to participate in a discussion focused around the questions posed in the assignment, or other questions you may have.

Evaluation

- **Attendance**: 20% (10% for each class). Full credit for attending both classes. Attendance for only a portion of a class may earn partial attendance marks for that class.
- **Participation:** 20% for participation during in-class discussions (10% for each class). This includes all in class discussions of guest speakers, campus tours, and assignments.
- **Assignments**: 60% (15% each of four assignments). Each assignment describes the breakdown of marks for that assignment. Included in assignment marks are multiple choice, short answer, and true/false questions, as well as online discussion comments.

Learning objectives

The aim of this course is to help students gain an appreciation that energy is fundamental to everything we do in life – i.e. fulfilling our demands for *energy services*. Working backwards from this viewpoint, students will understand how we have met these demands. As this course is developed through the UBC Bridge Program (www.bridge.ubc.ca), we will strive to focus on human health, engineering, and policy issues as appropriate.

The "meta-objectives" for this course are two-fold:

1. stimulate *critical thinking* and provide resources for further learning; we will avoid prescriptive assessments and conclusions
2. introduce students to classic readings and perspectives of leading thinkers that are related to energy

At the conclusion of this course, students will be able to understand and apply the following concepts:

- Basic energy pathway: services, technologies, carriers, and resources
- Physical rules of the game: what energy is; conservation; availability (entropy) and density
- Impacts: basic impacts throughout the energy pathway with a focus on human health
- Energy futures: introduction to known options for our future (Includes Policy: what policy is and how energy policy shapes our influences choices and future options)

Course Outline and Schedule based on two 3-hour classes

Class Preparation	SESSION 1: In-Class	Concepts	Gurus
• Reading(s): "The Energy System" by Scott, 1994. • Complete Assignment 1 (multiple choice & T/F by hardcopy; post discussion comments on WebCT by 6pm July 16)	• Introduction to the course: purpose, ice breaker, & WebCT demo (20 min) • Presentation: "The Energy System" (30 min) • Brief stretch (5 min) • In class discussion: Assignment 1 (15 min) • Presentation: "Energy & society" (30 min) • Feedback on course material (5 min) • Lunch break (20 min)	Energy system architecture (5 link chain) What is energy? Conservation Entropy Energy density	Scott Feynman
	• In-class problem solving: transportation exercise (30 min) • Introduce Assignment 2 & 3 (10 min) • Feedback on course material (5 min)	Consumption quantities & patterns (developed vs. developing countries) Quality of life (birth rates, life expectancy)	Smil Reddy Kammen
Class Preparation	**SESSION 2: In-Class**	**Concepts**	**Gurus**
• Reading(s): TBD • Complete Assignment 2 (short assignment) • Complete Assignment 3 (short-to-normal length assignment)	• Discuss Assignment 2 (15 min) • Presentation: Energy impacts (30 min) • Stretch break (5 min) • Discuss Assignment 3 (15 min) • Feedback on course material (5 min) • Lunch break (20 min)	Air pollution Climate change Land use Water use Human health	Smith Pope & Dockery Keith Rees ??
	• Presentation: Energy Futures (30 min) • In-class problem solving & discussion: video(s) [Lovins, energy in developing countries, social focus, …?] (30 min) • Introduce Assignment 4[1] (5 min) • Feedback on course material (10 min)	Actions vs. policies Energy policy Environmental policy Future options	Simon Jacaard Dowlatabadi ??

[1] Assignment 4 is due 1-week after the last class.