Name: _____

Please circle below three choices for your seminar presentation, and indicate your first, second, and third choices by the numbers 1, 2, and 3.

## *Seminar Topics Based on Course Objectives*

At the conclusion of this course, the student should have demonstrated awareness of:

1) the engineer's professional and ethical responsibilities, for example, (a) professional registration; (b) responsibility of the engineer to his/her employer and to society
    a) Why should I obtain an engineering license?
    b) ethical problem(s) faced by the engineer in industry
    c) other _____
2) the impact of engineering solutions in a global and societal context
    a) outsourcing of engineering jobs
    b) engineers without borders
    c) other _____
3) the necessity of lifelong learning for an engineer
4) environmental protection, including environmentally benign chemical processes
5) chemical process safety concepts, for example, (a) management for process safety; (b) safe handling of toxic materials; (c) principles of fires and explosions; (d) design for inherent safety
    a) case studies of fires, explosions, toxic releases: investigations of the Chemical Safety Board (up to 3 different cases)
    b) other _____
6) contemporary issues related to the process industries
    a) biofuels – can they really replace imported oil?
    b) hybrid vehicles – potential for reducing oil imports
    c) solar energy – economic potential
    d) other _____

**Other Sources for Presentation Ideas**

**1. Sustainable Development in Practice: Case Studies for Engineers and Scientists**

There are a few other suggestions for potential presentations taken from the book "Sustainable Development in Practice: Case Studies for Engineers and Scientists", Edited by Adisa Azapagic, Slobodan Perdan and Roland Clift, published by Wiley & Sons in 2004. This book presents case studies in sustainability, in which ethics are but one of many factors (social, economic, environmental) that must be taken into consideration when making technical decisions. These case studies could form the core of a presentation, with supporting information as necessary. From this book, the following case studies are viable:

Chapter 3. Waste Water Management: Identifying Sustainable Processes
Chapter 4. Integrated Prevention and Control of Air Pollution: The Case for Nitrogen Oxides
Chapter 6: Process Design for Sustainability: The Case of Vinyl Chloride Monomer
Chapter 7: Towards Sustainable Chemical Manufacturing: Polylactic Acid—A Sustainable Polymer?
Chapter 8: An Industrial Ecology: Material Flows and Engineering Design
Chapter 9: Scenario Building and Uncertainties: Options for Energy Sources
Chapter 10: Fuel Cells in Stationary Applications: Energy for the Future?
Chapter 11: Towards Sustainable Process Contracting: The Case of the Glass Industry
Chapter 12: Multi-Criteria Decision Analysis: The Case of Power Generation in South Africa
Chapter 13: Social and Ethical Dimensions of Sustainable Development: Mining in Kakadu National Park

If you select one of these topics, please indicate it as "Sustainable Development in Practice: Chapter X" in the other slot near 6) d).

**2. Sustainable Energy – without the hot air**

There are suggestions for potential presentations taken from the book "Sustainable Energy – without the hot air" by David J.C. MacKay, published by UIT Cambridge in 2009. This book is also available as a pdf free online at http://www.withouthotair.com/. This book endeavors to assemble a national sustainable energy plan for the United Kingdom, based not on catch-phrases and buzz words, but on numbers and the real limitations of the physics that govern various alternative energy strategies. These chapters are categorized into sources of energy consumption and sources of alternative energy production. They can be used as starting points for understanding the key points of the issue but will need to be supplemented with external material

Sources of Energy Consumption
- cars (Chapters 3 and 20 and Technical Chapter A)
- planes (Chapters 5 and 20 and Technical Chapter C)
- heating and cooling (Chapters 7 and 21 and Technical Chapter E)
- food and farming (Chapter 13)

These topics can be presented with an eye toward understanding their contribution to total energy usage, their contribution to climate change, opportunities for improvement, possible alternatives (either changes in technology or lifestyle), evaluating the effectiveness of proposed changes in terms of economic, environmental and social impact. While the book discusses some of these issues for the UK, the presentation could focus on a similar treatment for the US. Students are encouraged to think about safety and ethical issues associated with proposed alternatives. Examples of the potentially unethical misrepresentation of relevant data are also appropriate (and pretty easily found on the web).

Sources of Alternative Energy Production

wind and offshore wind (Chapters 4 and 10 and Technical Chapter B)
tide and wave (Chapters 12 and 14 and Technical Chapters F and G)
solar (Chapter 6 and Technical Chapter D)
nuclear (Chapter 24)

These topics can be presented with an eye toward understanding their contribution to total energy production, their contribution to climate change, opportunities for improvement, strengths and weaknesses, evaluating the effectiveness of proposed changes in terms of economic, environmental and social impact. While the book discusses some of these issues for the UK, the presentation could focus on a similar treatment for the US. Students are encouraged to think about safety and ethical issues associated with proposed alternatives. Examples of the potentially unethical misrepresentation of relevant data are also appropriate (and pretty easily found on the web).

If you select one of these topics, please indicate it as "Sustainable Energy Without the Hot Air: Topic X" in the other slot near 6) d).

**3. Additional topics**

Students are free to select other relevant topics of interest not listed above. One additional example is listed below.

biofuels – Are they economically viable? Do they lower Green House Gas emissions? Are they, as some opponents claim, an act of genocide on the world's poor?