ME 452 Sustainable Energy and Environment

Fall 2008

Instructor:

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Office hours: 11:15-1:15 P.M. (Tuesday), 3:00-5:00 P.M. (Thursday)

Objective:

This course introduces students to the fundamentals of current and emerging clean energy technologies. It covers a wide range of alternative/renewable energy sources, and presents the tools for assessing their sustainability and environmental impacts. It also reviews issues related to energy conversion, storage, material challenges and future opportunities.

Prerequisites / Co-requisites:

- ME 325 Thermal Fluid Sciences I (prerequisite)
- ME 375 Thermal Fluid Sciences II (co-requisite)

Text:

Sustainable Energy: Choosing Among Options, by J. W. Tester, E. M. Drake, M. J. Driscoll, M. W. Golay, and W. A. Peters, The MIT Press, 2005.

Reference:

Alternative Energy Resources: The Quest for Sustainable Energy, by P. Kruger, John Wiley & Sons, 2006.

Technical Papers.

Grading:

Assignments	10%
Term Project	20%
Exam I	30%
Exam II	40%

General Rules:

- Attendance at lectures is essential and students are expected to have read the material before each lecture.
- Exam will be closed book and closed notes.
- Project group may be composed of two students. In such cases, each member of the group is expected to contribute equally to the collective efforts.
- Make up exam/extension in report due dates will not be given except in cases

such as documented illness and similar reasons.
- The honor code will be in effect throughout the course.
- Some of the above rules may be changed during the term by a vote of the class.

Statement on Academic Integrity:

The University of Michigan-Dearborn values academic honesty and integrity. Each student has a responsibility to understand, accept, and comply with the University's standards of academic conduct as set forth by the Code of Academic Conduct, as well as policies established by the schools and colleges. Cheating, collusion, misconduct, fabrication, and plagiarism are considered serious offenses. Violations will not be tolerated and may result in penalties up to and including expulsion from the University.

Class Syllabus

Topics Covered:

- Introduction to sustainable energy
- Thermodynamic analysis of energy sources
- Environmental impacts of energy
- Fossil fuels and fossil energy
- Renewable energy in context
- Biomass energy
- Hydropower
- Solar energy
- Wind energy
- Hydrogen economy
- Hydrogen utilization – fuel cells
- Energy storage devices
- Choosing among options

Important Dates:

- September 18, 2008 Project Proposal
- September 25, 2008 Assignment I
- October 09, 2008 Assignment II
- October 16, 2008 Exam I
- December 02, 2008 Exam II
- December 04, 2008 Project Report & Presentation