ME 533: Energy Conversion

Instructor

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Class Time: Monday and Wednesday, 2:00-4:00 PM.

Classroom: GCB 206

Office Hours: Tuesday 1:00-2:00 PM, or by appointment

Course Description

Thermodynamic and mechanical aspects of modern energy conversion systems, including traditional systems such as steam electric power plants, gas turbines and internal combustion engines and refrigeration systems, and renewable systems such as solar, wind, geothermal. Combined heat and power and cogeneration are also considered, as well as economic and environmental aspects of energy conversion.

Grading

Homework	10%
Exam 1	25%
Exam 2	25%
Project	30%
Participation	10%

Homework will be assigned every two weeks and will count for 10% of the final grade. Homework should be turned in during class. Late homework will not be accepted.

Two exams will be given during the semester. The first will be an in class exam and will cover material from the first half of the semester. The final exam will be a take home exam. All exams are to be done individually. Collaboration of any kind will be grounds for a zero on the exam and possible disciplinary action.

The final project will focus on learning about state of the art energy conversion technologies. Teams of 2-3 students will work together to research a topic related to a new or advanced energy conversion technology. Teams will present their technology in class and will submit a written report. Grading will be based on your report, presentation and reviews by your fellow classmates. Details on the project will be given in class.

Class Policies

1. Academic dishonesty will not be tolerated. Students are expected to follow the BU Code of Student Responsibilities (http://www.bu.edu/dos/policies/student-responsibilities/)
2. Cell phone use during class or exams is not allowed. This includes phone calls, texting, browsing, calculator functions, etc.
3. Class begins promptly at 2:00PM. Late arrival is not permitted without prior approval.

Course Materials

Blackboard will be used for all class communications and documents.

Textbook

F.M. Vanek, L.D. Albright, L.T Angenent, *Energy Systems Engineering: Evaluation and Implementation*, 2nd Edition, McGraw-Hill, 2012.

Complementary Readings

1. K. Weston, *Energy Conversion,* EBook, http://www.personal.utulsa.edu/~kenneth-weston/.
2. A.W. Culp, *Principles of Energy Conversion*, McGraw-Hill, 1991.
3. Y.A. Cengel, M.A. Boles, *Thermodynamics*, McGraw-Hill, 2002.
4. D.Y. Goswami, F. Kreith, *Energy Conversion*, CRC Press, 2008.

Supplemental Reading

Selected articles, reports, and book chapters will be assigned throughout class to supplement the textbook. All supplemental readings will be posted on Blackboard.

Topics:

1. Overview of Energy Conversion
2. Economics of Power Production
3. Environmental Impacts
4. Thermodynamics Review
5. Wind
6. Solar
7. Ocean/Wave Energy
8. Geothermal
9. Other Renewable Energy Systems
10. Direct Chemical-Electrical Conversion
11. Vapor Power Cycles
12. Gas Power Cycles
13. Cleaning up fossil fuels
14. Nuclear Power