ME 533: Energy Conversion

Instructor
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Class Time: Monday and Wednesday, 10:10-11:55 AM.

Classroom: CAS 323B

Office Hours: Wednesday 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 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:

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Exam 1</td>
<td>20%</td>
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<td>Exam 2</td>
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<td>Project</td>
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<td>Participation</td>
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<td>Discussion Lead</td>
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Homework
Homework includes in-class assignments and assigned problem sets and will count for 10% of the final grade. Homework should be turned in during class. Late homework will not be accepted.

Exams
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.

The final exam will be a five page report discussing your vision for a sustainable energy future. The report must include citations, calculations to support your vision, a discussion of how your project topic fits (or does not fit) into your vision, and the economic implications of your vision.

All exams are to be done individually. Collaboration of any kind will be grounds for a zero on the exam and possible disciplinary action.

Project
The project will focus on learning about state of the art energy conversion technologies. Individuals or teams of 2 students will work together to research a topic related to a new or advanced energy conversion technology. Teams will present their technology in class during a mock poster session for the Energy Conversion Conference held mid-semester. Grading will be based on your abstract, poster, presentation and reviews by your fellow classmates. Details on the project will be given in class.
Participation
Participation includes in-class discussions, asking questions in class, attending office hours, answering questions, and generally being present and making an effort.

Discussion Lead
Teams of 2 will choose a reading relevant to the topic of day and lead a discussion on the reading. Readings should be selected a week before the class and 2 questions should also be assigned. The questions and a PDF of the selected reading should be emailed to Prof. Ryan one week ahead of class. Readings and questions will be posted on Blackboard.

Note: You must have different partners and topics for the project and the discussion lead.

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 10:10AM. Late arrival is not permitted without prior approval.

Course Materials:
Blackboard will be used for all class communications and documents.

Readings:
Selected articles, reports, and book chapters will be assigned throughout class and are posted to Blackboard.

Recommended Textbooks:

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