ME 427—Course Information and Policies

Course
ME 427 – Sustainable Energy Sources and Systems
Room: KT 226
Time: 3:00 p.m.–4:15 p.m. T Th

Instructor
Donald W. Mueller, Jr., Ph.D., P.E.
Office: ET 321J
Hours: 9:15 a.m.–10:15 a.m. M T Th F & 4:30 p.m.–5:30 p.m. T Th†
Phone: (260) 481-5707
Email: don.mueller@ipfw.edu
Web: http://www.etcs.ipfw.edu/~mueller

Description
An introduction to energy sources and energy systems with an emphasis on sustainability. Students will apply material from thermodynamics, fluid mechanics, and heat transfer to analyze and design energy systems that utilize non-renewable energy sources such as fossil fuels, nuclear fission & fusion, and hydrogen, as well as renewable energy sources such as solar, wind, biofuels, geothermal, and oceans. Economic, environmental, social, and political issues related to energy are also considered.

Course Outcomes
A student who successfully fulfills the course requirements will be able to:‡

1. evaluate and compare non-renewable and renewable energy sources for energy content and environmental impact. (a, e)
2. perform thermal, environmental, and economic analyses of energy systems. (a, e)
3. design energy systems (including economic analysis) and communicate results either orally and/or in writing. (c, g)
4. understand some of the ethical, economic, environmental, social, and political issues associated with energy and energy systems. (f, h, i, j)

Text

References
Thermodynamics, Fluid Mechanics, and Heat Transfer Texts
Chapters from the FE Reference Handbook
Selected articles and notes to be distributed

Topics
1. Introduction to Energy and Sustainability
2. Review of Thermal Sciences and Efficiency
3. Environmental Effects of Energy
4. Energy Sources, Systems, and Storage
5. Economic Analysis

†Available other times. If you need something, please stop by anytime that I am in my office.
‡Letters refer to program and ABET outcomes.
6. Fossil Fuels  
7. Nuclear Power  
8. Hydrogen Fuel Cells  
9. Solar Energy  
10. Wind Energy  
11. Biomass Energy  
12. Geothermal Energy  
13. Hydropower  
14. Ocean Energy (Waves, Tides, and Thermal)

**Homework**  
Homework is due at the beginning of the class on the due date. *No late homework will be accepted.* Some homework problems will require pencil and paper calculations; others will require the use of a computer. Please start each problem on a clean sheet of paper. While a general discussion of the homework is encouraged, copying is not permitted. Identical (or similar) submissions will result in zero on the assignment.

**Research Project**  
Each student will be assigned an energy source or technology to investigate and on which to report. The objective of this project is for the student to become an “expert” on the energy source and some of the associated technology. The student will develop a one-page summary and an annotated bibliography to distribute to the class. A 20-minute presentation to the class will also be required.

**Design Project**  
Students will be assigned a team project in which they are to design a sustainable energy system for a community. Economic and societal, as well as, environmental concerns should be considered. Students will make a poster or website describing their work.

**Article Discussion**  
Students will select, summarize, and present to the class recently published articles on energy related topics from the news and may lead a short discussion in class.

**Exams**  
There will be three exams. Two will be given in-class during the semester; one will be given during finals week. The final exam is scheduled for Thursday, December 15 from 10:30–12:30 p.m. The exams are closed book and closed notes. You will be allowed to use selected notes from the FE Handbook for reference.

**Grades**  
Averages will be calculated using the following point distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework/Article Discussion</td>
<td>5 %</td>
</tr>
<tr>
<td>Research Project</td>
<td>10 %</td>
</tr>
<tr>
<td>Design Project</td>
<td>10 %</td>
</tr>
<tr>
<td>Exams</td>
<td>75 %</td>
</tr>
<tr>
<td>Total</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Grades will be assigned in accordance with the following criteria:

\[
A \geq 90\%, \quad 89\% > B \geq 80\%, \quad 79\% > C \geq 70\%, \quad 69\% > D \geq 60\%, \quad F < 60%. \]

With the plus/minus grading system, the following grades are also available for assignment in this class: A–, B±, C±, and D±. These grades will be used to differentiate performance if warranted.

§These are maximum cut-offs.
Policies

As a courtesy to the instructor and other students, do not be late for class and turn off your cell phone.

No late homework. Late projects will be penalized—no projects accepted three days after the due date.

Many services are available to students. The Center for Academic Support and Advancement (CASA) offers tutoring in KT G23. Personal Counseling Services (373-8060) are available to students in Walb 210. Students with a disability in need of assistance should contact the SSD office in Walb 113 (481-6658 or www.ipfw.edu/ssd) for a description of services available.

Consult the student handbook for information pertaining to a grade appeal or grievance policies.

Please feel free to stop by any time if you have any comments or suggestions. I truly am interested in what you think about the course. Any suggestions that will benefit the class are appreciated, and I will try my best to address any concerns that you might have.

If you do not feel comfortable discussing matters with me, feel free to speak to Dr. Nash Younis, Chair of the Department of Civil and Mechanical Engineering.