INSTRUCTOR:

Orest G. Symko
316 J.C. Fletcher Building (JFB), Telephone: 581-6132, Fax: 581-4801, E-mail: orest@physics.utah.edu
Office Hours: 8:30 to 9:30 a.m., Tuesday, Thursday, or by appointment.
Secretary: Chase Adams, 201-A JFB, Telephone 585-1754

AIM:

This course deals with the conversion of various forms of energy for practical use around the world. It introduces concepts in energy and the physical principles used in transforming energy and storing it. In particular, the course examines energy technologies in the fuel cycle stage for fossil energy (oil, gas, synthetic), nuclear energy (fission and fusion), and renewable energy (solar, biomass, wind, hydro, and geothermal) along with storage, transmission, disposal, and conservation issues. Energy technology systems will be analyzed and evaluated in the context of global environmental goals. The course is an introduction to the global issues of energy and sustainability which are facing us.

TEXT:


TESTS:

1. February 20, 2014
2. April 15, 2014
3. FINAL: Wednesday, April 30, 2014, 10:30 am – 12:30 pm

Absolutely NO make-up tests!

GRADING:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 tests at 15% each</td>
<td>30%</td>
</tr>
<tr>
<td>1 final</td>
<td>30%</td>
</tr>
<tr>
<td>10 homeworks at 4% each</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>100%</td>
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</tbody>
</table>

INFORMATION:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>Last day to drop (delete) classes:</td>
<td>January 15</td>
</tr>
<tr>
<td>Martin Luther King Jr. Holiday</td>
<td>January 20</td>
</tr>
<tr>
<td>Last day to register:</td>
<td>January 21</td>
</tr>
<tr>
<td>Last day to withdraw from class:</td>
<td>February 28</td>
</tr>
<tr>
<td>President’s Day Holiday:</td>
<td>February 17</td>
</tr>
<tr>
<td>Spring Break:</td>
<td>March 9-16</td>
</tr>
<tr>
<td>Classes end:</td>
<td>April 23</td>
</tr>
<tr>
<td>Final Exam Period:</td>
<td>April 24 - April 30</td>
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</tbody>
</table>

PLEASE NOTE: LATE HOMEWORKS WILL NOT BE ACCEPTED!

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olinng Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.
1. **Introduction: What is Energy?**
   History, concept, linear and exponential growth, energy and understanding of the universe

2. **Mechanical Energy:**
   Kinetic energy, potential energy, conservation of energy, work, power, some machines, efficiency.

3. **Thermal Energy:**
   Heat, temperature, thermodynamics, heat transfer, second law of thermodynamics, Carnot engine, heat engines, efficiency, entropy, age of our planet.

4. **Electricity:**
   Generation, capacity, transmission, distribution, storage, AC and DC, smart grids.

5. **Fossil Fuels:**
   Carbon cycle, petroleum, coal, natural gas, oil exploration in the U.S. and the rest of the world, oil shale & tar sands, consequences, Hubert’s Peak.

6. **Transportation:**
   Internal combustion engines, electric propulsion, hybrid vehicles, friction, social costs.

7. **Fossil Fuels and the Environment:**
   Thermal pollution, greenhouse effect, Kyoto Protocol, global warming, air pollution.

8. **Nuclear Energy:**
   Fission, nuclear reactors, fusion, failures, waste, radiation.

9. **Geothermal Energy:**
   The Earth, electricity generation, heat pumps.

10. **Solar Energy:**
    The Sun, solar insulation, solar heating and cooling, solar electricity, efficiency.

11. **Biomass Energy:**
    Photosynthesis, energy crops, conversion, waste.

12. **Wind Energy:**
    Global wind patterns, turbines, wind power and efficiency, performance, environment

13. **Hydro Energy:**
    Hydroelectric, tidal, wave energy, turbo-machinery, thermal gradient, salinity gradient.

14. **Economics of Energy and the Environment, World Impact, a Sustainable Future:**
    Marketing, costs, pollution, the environment, sustainability, technology, global issues.

15. **Sustainable Future:**
    Sustainability, issues.
REFERENCES:

- Homebrew Wind Power, Dan Bartmann and Dan Fink, 2009, Buckville Publications LLC.