PHYS 161: PHYSICS OF ENERGY & ENVIRONMENT

SYLLABUS

Instructor
Steve Kevan
177 Willamette
346-4742
kevan@physics.uoregon.edu
Office Hours: Tu 3:30–4:30 pm and We 2:30-4:00pm

Teaching Assistant
None. GTF’s regularly staff room 141 Willamette (directly across the atrium from 110 Will) to help students in lower division physics classes. You should make use of this—it’s free. A schedule is posted on the door to that room and elsewhere around Willamette Hall.

Time and Place
Tuesday and Thursday, 2:00-3:20pm, 110 Willamette Hall

Format
Lectures, lots of demonstrations, worked problems, the occasional quiz

Text
Energy: Its Use and the Environment, Hinrichs and Kleinbach. This text is nominally required, but it is admittedly rather expensive for a 1-term, 100-level course ($93.50 new). It is a very good text—much better than what has been used in past years. You might be able to save some money by purchasing a used copy at the book store or on Amazon.com. Also, I will place two copies on reserve in the Science Library on 2-hour/overnight reserve. The problem sets will be placed on Webassign, so you will not strictly need the text to do those. Also, you are welcome to work together on the homework, the ‘further activities’, and even the reading if you feel so inclined, so you could possibly share books.

Web stuff
Course site:
http://physics.uoregon.edu/~kevan/2005/ph161/ph161.html. You can find lecture notes and all course materials there. The lecture notes are converted MS Powerpoint files and are best viewed on Internet Explorer.

Blackboard, for grading only: http://blackboard.uoregon.edu/

Webassign, for problem sets: https://www.webassign.net/login.html

The best way to reach me outside class and office hours is by e-mail at kevan@physics.uoregon.edu. I do not regularly check messages on blackboard or webassign, so, on the outside chance you want an extension on a homework, request it via e-mail, not on webassign.

Objectives
1. Have fun
2. Become well informed on the topic of energy, its use in our society, and the impact of this use on our environment, so that you may participate in the national debate and make smart decisions
3. Understand the physical concept of energy and learn to identify it in the world around us
4. Learn to calculate energy content/conversion
5. Learn about the energy usage in our lives
6. Discuss the (bleak?) future of energy production
7. Discuss the side-effects of energy production and use

Student requirements
1. Attend lectures
3. Do the homework on time or at least not too late.
3. Do the homework—on time or at least not too late.
4. Explore, think, read, ask, speculate, admire (not me!), enjoy.

Homework is on Webassign, which can be reached here. Problems from the text will be assigned approximately biweekly, mostly in a multiple choice format. You will have up to 5 tries to get each problem right, so you should be able to get 100% on every problem set if you work at it. You will find that I am generally happy to grant extensions on homework assignments—just send an e-mail. The exception to this is when a quiz is approaching. You need to catch up before each quiz.

To access the homework, go to http://www.webassign.net/login.html. If your primary U of O email address is aduck2@uoregon.edu or aduck2@gladstone.uoregon.edu, then your user name on Webassign will be aduck2. If your primary U of C e-mail address is outside the uoregon domains, e.g., huskyhaters@aol.com, then Weassign usually assigns something like your first initial and last name, but it makes weird changes (so this person’s user name is sbranste, for example).

Your institution is uoregon.

Your password has been set to ph161, but it is advisable to change that within Webassign when you first log in else there is a distinct possibility of mischief by your supposed friends.

If you manage to login correctly, you should be able to follow your nose to find the homework sets. If not, contact me and we’ll get it straightened out. The Physics Department is paying for your access to Webassign; if you find yourself being asked to pay for access, something is wrong.

---

Homework

Math requirement

1. Simple graphs
2. Basic algebra
3. Averages and very simple statistics

---

Grading

1. Homework: 20% of your grade.
2. 3 quizzes: 20% of your grade each, 60% total. These will be a mixture of ~5 multiple choice, ~10 short answer, and 1 or 2 simple numerical problems.
3. Doing and writing up any three 'Further Activities' described at the ends of the chapters in the text: 20% of your grade. These will be due at approximately monthly intervals.
4. Extra credit for stump the prof, that is, asking a question that is relevant to the course material: 1% increase (extra credit) in final grade per stump. I will be the judge of what is relevant, but you’ll still find it pretty easy to stump me.
5. You may replace your lowest quiz score (or just not take one quiz, if you like) by doing and writing up 3 more 'Further Activities', again at (at least) monthly intervals.
6. Final quiz will be held in the final exam slot; it will not be comprehensive.
Physics 161: Physics of Energy and Environment

Fall 2005

Syllabus
Webassign Login
What's a 'Further Activity'?

Contacts:
Prof. Steve Kevan
kevan@physics.uoregon.edu
176 Willamette Hall
Phone: 541-346-4742

Energy Conversion Factors (just in case)

Course Outline:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Subject</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pdf</td>
<td>Sept. 27 Introduction</td>
<td>Read chapter 1</td>
</tr>
<tr>
<td>2</td>
<td>pdf</td>
<td>Sept. 29 Resources, usage, exponential growth</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>pdf</td>
<td>Oct. 4 Energy mechanics, motion</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>pdf</td>
<td>Oct. 6 Energy and work, power</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>pdf</td>
<td>Oct. 11 Conservation of energy</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>pdf</td>
<td>Oct. 13 Energy exchange; units (ugh)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>pdf</td>
<td>Oct. 18 Heat and work; first law</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>pdf</td>
<td>Oct. 20 Heat and work, second law, entropy</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>pdf</td>
<td>Oct. 25 Quiz #1: Chapters 1-4</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>pdf</td>
<td>Oct. 27 Energy conservation, heat pumps and AC</td>
<td>Read chapters 5 and 6</td>
</tr>
<tr>
<td>11</td>
<td>pdf</td>
<td>Nov. 1 Solar energy: characteristics</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>pdf</td>
<td>Nov. 3 Fossil Fuels</td>
<td>Read chapter 7; Homework #3 due Friday 11/4</td>
</tr>
<tr>
<td>13</td>
<td>pdf</td>
<td>Nov 8 Fossil fuels</td>
<td>Further activity #2 due</td>
</tr>
<tr>
<td>14</td>
<td>pdf</td>
<td>Nov. 10 Air pollution</td>
<td>Read chapters 8 and 9</td>
</tr>
<tr>
<td>15</td>
<td>pdf</td>
<td>Nov. 15 Quiz #2: Chapters 5-9</td>
<td></td>
</tr>
</tbody>
</table>

Temperature and atmospheric CO₂ concentration over the millennia deduced from glacial core samples, from here.
<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Topic</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 17</td>
<td>pdf</td>
<td>Electricity: charges, currents</td>
<td>Read chapter 10; Homework #4 due Friday 11/18</td>
</tr>
<tr>
<td>Nov. 22</td>
<td>pdf</td>
<td>Electricity: voltage, circuits</td>
<td>Read chapter 11</td>
</tr>
<tr>
<td>Nov. 29</td>
<td>pdf</td>
<td>Electromagnetism: generators</td>
<td>Read chapter 12</td>
</tr>
<tr>
<td>Dec. 1</td>
<td>pdf</td>
<td>Solar, Hydro, wind, bio</td>
<td>Read chapter 13, Further activity #3 due</td>
</tr>
<tr>
<td>Dec. 6</td>
<td>pdf</td>
<td>Atoms and the nucleus</td>
<td>Read chapter 14; Homework #5 due Friday 12/9</td>
</tr>
<tr>
<td>Dec. 8</td>
<td>pdf</td>
<td>Nuclear energy</td>
<td>Final exam slot; 1:00pm, Thursday Dec 15</td>
</tr>
<tr>
<td>Dec. 15</td>
<td>pdf</td>
<td>Quiz #3: Chapters 10-14</td>
<td></td>
</tr>
</tbody>
</table>
Science and Civilization
Phys 199 Sp St College Connection, Fall 2005,
16 Pacific, Tuesday 11:00-11:50
Instructors and TA
Robert Zimmerman, Rm 448 Wil., Phone 346 5211, bob@zim.uoregon.edu
John Nicols nic@darkwing.uoregon.edu
Matthew (Mat) Stewart mstewar4@gladstone.uoregon.edu

Course Description:
This College Connections course is designed to help you make a successful transition into the University of Oregon. This class will cover topics on practical advice and academics. The practical proprot will address issues such as: i. Academic programs and requirements; ii. Study skills and test taking; and iii suggestion for making a two or four year plan for your undergraduate education. The academic portion will address topics related to but not covered in your History and Astronomy courses.

Grading: The grade will be determined from class participation and attendance.

Current Outline
1. 9/27 Class Goals, Ice Breaker, Campus and Services(Mat), Remarks JN, Remarks RLZ
   Thursday Pizza on Thursday at Track Town Pizza (5:30 PM) (RLZ)
2. 10/4 The measurement of Time and the Sundial Project:
   Sundial Project and the History of Time (JN), Relativity (RLZ)
3. 10/11 What is in the Library (MS): Meet on the second floor of the Knight Library
   Group Study 10/12
4. 10/18 Early Greeks (Nicols and Zimmerman): Class Debate on defending the Earth-Centered model of the Heavens and the Greek Laws of Motion. JN on the transition from Myths to Science, RLZ on early Greek Scientific achievement,
5. 10/25 Study and Test Skills (MS): Tips on time management, studying, and taking notes tests
6. 11/1 Renaissance (Nicols and Zimmerman): Class on the trial of Galileo JN on the preservation and reintroduction of Greek accomplishment to the 1400’s, RLZ on the implications, and
   Group Study
7. 11/8 Two-year plan: Curriculum Overview and visit by other Profs.
8. 11/15 Schedule for Winter Term
   (JN) Ice Cream or Pizza
9. 11/22 Advancements in the 19th and 20th Century (Nicols and Zimmerman (QM)): Group Study
10 11/29 (DEAD Week) Reflection on the Past and Future