WACKY OR REAL - PH335U

FALL TERM 2015

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Office Hours: Monday 1130-1230 and by appointment
Office: 150 SRTC aka SB2
Grader:

Wacky or real? Physics perceptions in the everyday world.
Or alternatively: How things work....

This is a unique, one of a kind physics course designed to enhance scientific thinking about the physical world.

For whom? “Seekers of the truth,” individuals with an “open” mind, science and non-science majors, and especially future teachers.

Goals:
1. To develop an understanding of what science really is and understand how the scientific process actually works and how it’s trickier than you think
2. Learn physics (see the physics areas below), and apply it to your knowledge of science and the scientific process in the real world

The class will:
1. utilize extensive demonstrations, magic, and ire-inducing discussions, i.e., we all know we are all descendants of Vega (Vegans)
2. have no labs
3. not require a calculator
4. have no traditional homework, hence no problem like the following (plagiarized):
   "In his short story "A Slight Case of Sunstroke", Arthur C. Clarke writes of a stadium full of disgruntled soccer fans barbecuing the dishonest referee by reflecting sunlight on him with mirrors found under their seats.

   "a. Imagine a stadium at the equator at noon (i.e. the sun is directly overhead), with 10,000 fans (about the capacity of Jeld-Wen Field). Assuming that sunlight delivers about 1000 watts per square meter to the surface of the Earth, and that each fan is holding a 0.25 m$^2$ mirror at 45$^\circ$, how much power would be available to be projected onto a dishonest referee?

   "b. To be humane, let’s replace the referee with a 50 kg cylinder of water. Assuming this cylinder absorbs all of the reflected light from the mirror – wielding fans, how long will it take him to reach 100$^\circ$C or 212$^\circ$F? (The heat capacity of water is about 4200 J/kg/K).
### Tentative schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Class #</th>
<th>Topics</th>
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<tbody>
<tr>
<td>9/28</td>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td>9/30</td>
<td>2</td>
<td>Overview</td>
</tr>
<tr>
<td>10/5</td>
<td>3</td>
<td>Mechanics I</td>
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<tr>
<td>10/7</td>
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<td>Mechanics II</td>
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<tr>
<td>10/12</td>
<td>5</td>
<td>Thermodynamics I</td>
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<td>10/14</td>
<td>6</td>
<td>Thermodynamics II</td>
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<tr>
<td>10/19</td>
<td>7</td>
<td>Sound, hi-fi I</td>
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<tr>
<td>10/21</td>
<td>8</td>
<td>Sound, hi-fi II</td>
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<tr>
<td>10/26</td>
<td>9</td>
<td>Electricity and magnetism I</td>
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<tr>
<td>10/28</td>
<td>10</td>
<td>Electricity and magnetism II</td>
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<td>11/2</td>
<td>11</td>
<td>Electricity and magnetism III</td>
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<tr>
<td>11/4</td>
<td>12</td>
<td>Light I</td>
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<td>11/9</td>
<td>13</td>
<td>Light II</td>
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<td>11/11</td>
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<td>Holiday</td>
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<td>11/16</td>
<td>15</td>
<td>Nuclear physics I</td>
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<td>11/18</td>
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<td>11/23</td>
<td>17</td>
<td>Quantum Mechanics I</td>
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<tr>
<td>11/25</td>
<td>18</td>
<td>No class</td>
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<tr>
<td>11/30</td>
<td>19</td>
<td>Quantum Mechanics II</td>
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<tr>
<td>12/2</td>
<td>20</td>
<td>Quantum Mechanics III</td>
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<tr>
<td>12/7</td>
<td>Final</td>
<td>1930-2120 – note this is different than the normal class time</td>
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### Grading

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<tr>
<th>Component</th>
<th>Percentage</th>
<th>Date</th>
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<tbody>
<tr>
<td>Participation/attendance</td>
<td>15%</td>
<td>Weekly noted</td>
</tr>
<tr>
<td>Paper/assignment</td>
<td>20%</td>
<td>December 2</td>
</tr>
<tr>
<td>Homework</td>
<td>5%</td>
<td>As assigned</td>
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<tr>
<td>Final exam</td>
<td>30%</td>
<td>December 7, 2015; 1930pm</td>
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<tr>
<td>Quizzes</td>
<td>25%</td>
<td>Worst three will be dropped</td>
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As an alternative to the paper and final, groups of four (I will form the group(s) out of volunteers) write a “textbook” to be handed out to future classes. Assuming the work is good: The grade for those groups will be an A. Groups will be formed by 10/9.

Required reading: handouts as provided or made available online.
Required your participation; no textbook, no clicker. Just an active mind!