SYLLABUS: EEL 4935-003/EEL 6935-003 - SUSTAINABLE ENERGY

CROSS-LISTED IN CHEMISTRY AS CHM 4932-003/6938-003

Instructor: Dr. R. Schlaf
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Phone: 974-8463
Office: ENB 372A
Office Hours: M/W 1-3 pm.

Target group: 3000-4000/6000. This course aims to give an interdisciplinary introduction to the field and is open to students from all engineering and science departments. A basic knowledge of physics and math will be required.

Course Materials: A number of scientific publications, book excerpts, public policy documents/panel reports, and various web resources will be used. All documents will be posted on Blackboard.

Course Objectives:

a) Introduce to the scientific background of energy production, storage and consumption.
b) Quantify the impact of the various energy production and storage technologies, as well as paths of energy use/consumption.
c) Discuss feasibility/cost of the most prominent sustainable energy production methods.
d) Discuss challenges to achieve sustainable energy production.

Course Description:

This course aims to introduce students to concepts of sustainable energy production. Solar, wind, hydroelectricity, hydrogen, biomass and geothermal energy production methods as well as main storage technologies will be discussed. These major production methods will be quantitatively compared throughout the course with the main energy consumption pathways of human societies in different parts of the globe. Energy consumption of transportation, heating/cooling, food production and manufacturing of
goods will be discussed. Energy savings potentials of the various consumption pathways will also be examined. After successful participation in this course students will be able to assess technological aspects of public energy policy, as well as have the foundation for advanced study of sustainable energy topics.

**Pre-requisites:** Physics I, Calculus I&II.

**COURSE STRUCTURE:**
Two lectures per week.

Location: TBA

Time: M/W 3:05-4:20pm

TA: TBA

**STUDENTS' OBLIGATIONS:**
Read book/journal papers/web sites before lecture/do occasional homework

**COMMUNICATION POLICY:**
The instructor will use Blackboard (URL: https://my.usf.edu) as main communication channel for announcements and course materials. All students are expected to check Blackboard at least once every 48 hours for course announcements.

**GRADING POLICY:**
This is a combined graduate/undergraduate course. Two different grading policies will therefore apply:

1) Graduate Students:
   
   Final Grade: 2 Exams; No final exam. ~50%
   Approximately 6 quizzes ~25%
   Web site (see below) ~25%

2) Undergraduate Students:
   
   Final Grade: 2 Exams; No final exam. ~70%
Approximately 6 quizzes ~30%

Grades will be assigned according to the following approximate scale:

- A  >90%
- B  80-89%
- C  70-79%
- D  60-69%
- F  <60%

-Graduate and undergraduate cohorts will be curved independently to achieve fair grade distributions in both groups.

-There will be two non-comprehensive exams. Dates and details will be announced at least one week prior to each test.

-Make-up exams will be given only under very special circumstances. Appropriate documentation in writing (doctor’s certificate, police report etc…) will have to be provided by the students.

-Quizzes will be given approximately every second week.

**Additional Graduate Student Obligations:**

Graduate Students will (Undergraduates can also for additional credit) design a web site for a sustainable energy related topic of their choice (approval of the instructor is needed). This website needs to contain:

a) An introduction to the topic of choice

b) A thorough background review

c) A discussion of the currently pursued scientific/policy etc...approaches to the topic of choice

d) A comprehensive list of references used for the website
References must be clearly listed. Copy/pasting from the work of others will not be accepted (unless clearly marked with quotation marks and reference shown) and treated as plagiarism.

Procedure:

Graduate student abstracts for web sites are due on **Feb 17**. Write 1/2 page what topic will be discussed on your web site and what you plan to post.

April 7: Graduate student web sites need to be posted on each student’s USF web site, and working links emailed to the instructor.

After the links have been posted, all students of the class (including undergraduates) will grade the web sites and email their list of grades to the instructor (**deadline: Day of last class period before finals week**). The averages of the student’s grades (50%), together with the instructor’s grades (50%), will determine the final grade for each web site.

**NOTICE OF PERMISSION/NON-PERMISSION TO SELL NOTES OR RECORDINGS OF CLASS LECTURES:**

It is not permitted to sell notes or recordings of class lectures. All unauthorized recordings of class are prohibited. Recordings that accommodate individual student needs must be approved in advance, and may be used for personal use during the semester only; redistribution is prohibited.

**POLICY ON RELIGIOUS HOLIDAYS:**

Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, by the second class meeting.

**POLICY ON CAMPUS EMERGENCIES:**

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It is the responsibility of the student to monitor
Blackboard site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.

**TENTATIVE SCHEDULE:**

This schedule is tentative and will likely change as we proceed through the semester.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 10/12</td>
<td>Fossil Fuels/CO₂ : Currently our main energy source-Review of impact on environment and supply issues.</td>
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<td>2</td>
<td>Jan 17/19</td>
<td><strong>Martin Luther King Day</strong> Basic energy considerations, a bit of the old ‘thermo’ and some more basic physics, energy units. <strong>Quiz 1</strong></td>
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<td>3</td>
<td>Jan 24/26</td>
<td>More thermo, Transportation (cars, trains, planes)</td>
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<td>4</td>
<td>Jan 31/Feb 2</td>
<td>More transportation, <strong>Quiz 2</strong></td>
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<td>5</td>
<td>Feb 7/9</td>
<td>Solar Energy (photovoltaics, solar thermal)</td>
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<td>6</td>
<td>Feb 14/16</td>
<td>Solar Energy <strong>Quiz 3</strong> Feb 16: Graduate student abstracts for web sites due.</td>
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<td>7</td>
<td>Feb 21/23</td>
<td>Solar Energy</td>
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<td>8</td>
<td>Feb 28/March 2</td>
<td>Solar energy <strong>Quiz 4</strong></td>
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<td>9</td>
<td>March 7/9</td>
<td>Bioenergy <strong>Exam 1</strong></td>
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<td>10</td>
<td>March 14/16</td>
<td><strong>Spring Break</strong></td>
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<td>11</td>
<td>March 21/23</td>
<td>Bioenergy, Wind Energy</td>
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<td>12</td>
<td>March 28/30</td>
<td>Guest lectures: Desi Saludes: Denmark and Ed Mierzewski: Public transport <strong>Quiz 5</strong></td>
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<td>13</td>
<td>April 4/6</td>
<td>Fluctuation and Storage</td>
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<td><strong>April 6: Graduate student web sited need to be posted and links emailed to the TA and the instructor.</strong></td>
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<td>14</td>
<td>April 11/13</td>
<td>Fluctuations and storage/smart grid (guest lecture Lingling Fan) <strong>Quiz 6</strong></td>
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<td>15</td>
<td>April 18/20</td>
<td>Nuclear Energy</td>
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<td>16</td>
<td>April 25/27</td>
<td>Energy in common materials; <strong>Exam II</strong></td>
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<td><strong>April 27: All Students need to have their grades for the web sites emailed to the TA and the instructor.</strong></td>
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