

**Applications of Energy Efficiency and Conservation  
ERG 199, 2-3 Units**

**Spring 2008  
Monday 12pm – 2pm  
203 Wheeler**

**Instructor of Record:** Daniel Kammen      [Kammen@berkeley.edu](mailto:Kammen@berkeley.edu)

**Student Instructors:**

|              | <b>Desirae Early</b>   | <b>Vi Do</b>          | <b>Shawn Orgel-Olson</b> |
|--------------|------------------------|-----------------------|--------------------------|
| Email        | Desirae_E@Berkeley.edu | vido1218@berkeley.edu | sorgelolson@gmail.com    |
| Telephone    | (909) 921-5807         |                       |                          |
| Office Hours | By Appointment         |                       |                          |

**Course Website:** <http://groups.google.com/group/er199>

**Course Description and Objectives:**

This course serves as an introduction to using energy efficiency and conservation in real applications. Students will apply background academic knowledge of the energy sector to work on energy and climate problems at UC Berkeley. Students will:

- Learn how to conduct energy audits from professionals
- See how to reduce energy consumption in different types of building spaces (commercial, residential, labs...)
- Consider the range of energy conservation tools in solving climate change and energy supply problems
- Utilize classroom experience in real applications of conservation at UC Berkeley

**Prerequisites:** ER 100, ER 102, ER 98/198, or consent of the student instructors. Students who have not taken one of the prerequisite courses will need to do a small energy audit assignment at the beginning of the course.

**Course Grading: (Tentative)**

**Three Units**

|                              |     |
|------------------------------|-----|
| Attendance and Participation | 10% |
| Project                      | 50% |
| Field Reports                | 20% |
| Final Paper                  | 20% |

**Two Units**

|                              |     |
|------------------------------|-----|
| Attendance and Participation | 25% |
| Project                      | 50% |
| Final Paper                  | 25% |

**Student Projects:**

The student projects will involve working in campus buildings to conduct energy audits and work with building coordinators on reducing energy consumption through efficiency and behavioral changes. At the end of the project, the students will present an analysis of their building and lead a field visit through their building highlighting changes, recommendations, and other interesting things. A more detailed description of the project and each component will be handed out the second week of class.

Timeline:

|      |                          |
|------|--------------------------|
| 1/28 | Building Preferences DUE |
| 2/4  | Weekly Schedule DUE      |

|              |  |
|--------------|--|
| 2/11 to 2/15 | Initial Meeting with Building Coordinator                      |
| 2/25         | Timeline for Energy Conservation Campaign DUE                  |
| 3/17         | Portfolio Manager Template and Rating DUE, Computer Survey DUE |
| 4/7          | Inhabitant Surveys DUE   |
| 4/28         | Lighting Audit DUE   |
| 5/5          | Building Recommendation DUE                                    |
| 5/5 to 5/12  | Final Meeting with Building Coordinator                        |
| 5/5 and 5/12 | Final Presentations to Class and Site Tour                     |

**Field Reports:**

The field visit will involve touring either a LEED building, the Wheeler classroom renovations, or one of the Green Demonstration Areas. We will set up a few tours for you to choose from. After touring one of these areas the students will write a report on the green aspects of these areas, focusing on the energy efficiency mechanisms that were used and their benefits. The report will be 2-4 pages long.

**Final Paper:**

The final paper will be a reflection paper on what you learned through the course of the semester and how you contributed to the student project. We will provide some questions for you to answer to guide you through the process. The paper will need to be 2-3 pages for students taking the course for 2 units and 4-6 pages for the students taking the course for 3 units.

**Readings:**

There is no textbook for this course. Readings will be available via the course website and will include supplements to the class presentations. Most of the readings will be guides or selections from books that detail necessary skills for completing the student projects. The readings were carefully selected to be as useful as possible. We will also provide links to further information should you want more detail on some of the topics.

**Course Outline:**

| Week | Date | Topic  | Assignments  | Reading  |
|------|------|--|--|--|
| 1    | 1/28 | Course Introduction<br>Class Expectations<br>Building Project Introduction<br>Cal CAP Study<br><i>Fahmida Ahmed , CalCAP<br/>Merrian Fuller and Sam<br/>Borgeson</i> | <ul style="list-style-type: none"> <li>• Turn in building preferences by end of class</li> </ul>               | <ul style="list-style-type: none"> <li>• CalCAP Study Report,</li> <li>• Campus Sustainability Assessment</li> </ul> |
| 2    | 2/4  | Building Assignments<br>Lighting Systems, Technologies, and Auditing<br><i>Raul Abesamis, Physical Plant</i>   | <ul style="list-style-type: none"> <li>• Schedule DUE by midnight</li> </ul>                                   |  |
| 3    | 2/11 | Initial Group Meeting  | <ul style="list-style-type: none"> <li>• Energy Audit DUE (if needed)</li> <li>• Meet with Building</li> </ul> |  |

|    |       |   | Coordinator   |  |
|----|-------|---|---|--|
| 4  | 2/18  | No Class (Holiday)  |   |  |
| 5  | 2/25  | Portfolio Manager Training  | <ul style="list-style-type: none"> <li>• Timeline DUE</li> <li>• Start computer audit, portfolio manager, lighting audit, and inhabitant surveys</li> </ul> | <ul style="list-style-type: none"> <li>• Sections from LEED EB guides</li> </ul>   |
| 6  | 3/3   | Energy Efficiency in California<br><i>Dan Kammen, Energy and Resources Group</i>  |   | <ul style="list-style-type: none"> <li>• Fostering Sustainable Behavior</li> </ul> |
| 7  | 3/10  | Lab Energy Use<br><i>Dale Sartor, LBNL</i><br>Green Building and LEED Certification<br><i>Judy Chess, Capital Projects</i>                                  | <ul style="list-style-type: none"> <li>• Field Reports DUE</li> </ul>   | <ul style="list-style-type: none"> <li>• Office equipment guide</li> </ul>         |
| 8  | 3/ 17 | Designing Effective Behavior-Change Programs<br><i>Kif Scheuer, Strategic Energy Innovations</i><br><i>Lisa Bauer, Campus Recycling and Refuse Services</i> | <ul style="list-style-type: none"> <li>• Portfolio Manager Template and Rating DUE</li> <li>• Computer Survey DUE</li> </ul>                                | <ul style="list-style-type: none"> <li>• HVAC energy trainer</li> </ul>            |
| 9  | 3/ 24 | No Class (Holiday)  |   |  |
| 10 | 3/ 31 | Energy audits, rebates and incentives<br><i>PGE Representative Lisa McNeilley</i><br>Workday (Design and plan educational programs)                         | <ul style="list-style-type: none"> <li>• Start educational programs</li> </ul>  |  |
| 11 | 4/ 7  | Building Commissioning, HVAC  | <ul style="list-style-type: none"> <li>• Inhabitant surveys DUE</li> </ul>  |  |
| 12 | 4/ 14 | Business Communication and Consulting<br>Grant Writing and Program Proposals  |   |  |
| 13 | 4/ 21 | Sustainability Summit   |   |  |
| 14 | 4/ 28 | Careers<br>Google.Org<br>PG&E<br>ASE / SEI<br>CPUC  | <ul style="list-style-type: none"> <li>• Lighting audits DUE</li> </ul>   |  |

|    |       |  |   |  |
|----|-------|--|---|--|
| 15 | 5/ 5  | Building Presentations   | <ul style="list-style-type: none"><li>• Building recommendations DUE</li><li>• Meetings with Building Coordinator</li></ul> |  |
| 16 | 5/ 12 | Finish Building Presentations<br>Evaluations<br>Course Celebration | <ul style="list-style-type: none"><li>• Reflection paper DUE</li></ul>  |  |