“Never doubt that a small group of thoughtful committed citizens can change the world. Indeed it's the only thing that ever has.” – Margaret Mead

Environmental Studies 105, Renewable Energy and the Environment, is an elective upper division course. It is a necessary course for Environmental Studies students who are interested in energy as a possible career, and a useful elective course for engineers interested in renewable energy. A multidisciplinary approach is stressed in the class, developing in students a coherent conceptual framework about renewable energy with emphasis on solar energy. It is taught in such a way as to be of interest to liberal arts majors as well as engineers, and has been responsible for drawing new students into the ES major. How renewable energy fits with environmental-energy options in both developed and developing nations is a focus of the course. Invited speakers from the solar energy industrial world will also present the latest developments and implementations.

The course begins with a brief discussion of energy use, non-solar energy sources, and an historical review of solar energy. The importance and relevance of the laws of thermodynamics to environmental-energy relationships, energy crises, and solar energy utilization are examined. Both direct and indirect solar technologies are studied in terms of their effects on the physical, social and economic environments. Topics include passive and active solar heating and cooling, energy from photosynthesis, photovoltaics, hydrokinetic energy (ocean currents, waves, and tides), ocean thermal energy conversion, and other solar electric systems. Finally, the significant relationships between energy storage, utility interfacing and solar energy use are discussed.

~ Mel

Course Goals
Throughout the quarter, students will develop an understanding of:

1. The strengths and weaknesses of various renewable energy sources and their relation to sustainability
2. The physical principles and quantitative aspects that govern renewable energy generation and use
3. The hierarchy of solar energy technologies, including direct and indirect
4. The role of the laws of thermodynamics in relation to the production and utilization of solar renewable energy
5. The bridge between solar and fossil energy generation

Lectures
Mondays  5:00p-6:20p
Wednesdays  5:00p-6:00p
Buchanan 1910

Instructor
Mel Manalis, PhD (manalis@es.ucsb.edu)
Office:  Bren 4005  Office Hours Posted on Gauchospace

Assistant Instructor
Quentin Gee, PhD (qgee@es.ucsb.edu)
Office:  Bren 4005  Office Hours Posted on Gauchospace

i>Clickers
i>Clickers will be used to take attendance as well as enhance student participation and comprehension of key issues. It is your responsibility to have an i>Clicker and use it regularly. Leaving lecture early or arriving late may affect your i>Clicker score. You will have two (and only two) i>Clicker days dropped regardless of excuses. Please do not ask for exceptions beyond this except in circumstances when you have permanently lost your i>Clicker and need to register a new one.
Course Assistants
Tori Greenen
Maddy Yeack
Nolan Stephens

Course Website
All major course content will be posted on Gauchospace. This includes key slides from lectures, online readings, homework questions, review guides, and contact information.
https://gauchospace.ucsb.edu/

Required Readings
Assignments will be made on Mondays and posted on Gauchospace. There are several sources of your required readings:
2. *Sustainable Energy without the Hot Air*, by David MacKay (Posted on Gauchospace)
3. Recent and important news stories (Posted on Gauchospace)

Homework Problems
Homework problems will be posted on Gauchospace. There are two sets of homework problems to be assessed by one homework quiz per set. Verification of your homework completion is done by you taking a homework quiz on Gauchospace. There will be a two-day window for you to take your quiz (you cannot “pause” the quiz). Within the window, and after completing all problems for the given HW assignment, you can begin the Gauchospace quiz, and will have 30 minutes to answer questions based on the HW questions. See the “Homework Quiz Info” document on Guachospace for more information.

Exams
Exams will cover lectures, key slides, readings, homework problems and HW quiz questions. There will be two exams (see course schedule on the next page).

Grading
Your grade will be assigned as follows:
- Homework Quizzes, i>Clicker  20%
- In Class Midterm Exam 1  40%
- In Class Midterm Exam 2  40%

To pass the class, you must earn an average of 50% or higher on your in class midterm exam scores.

Diversity Statement
This course is designed in part to help you understand broader issues in society that relate to social harms and potential benefits to traditionally disenfranchised or otherwise marginalized groups of people, particularly involving gender and racial issues at the international level, as well as socioeconomic trends in the United States. Addressing these issues requires an open mind to forms of institutional failure and mechanisms for empowerment from both a historical and a future-oriented perspective. It is our hope that you take these problems and their causes to heart, and think about such broader patterns throughout your academic, intellectual, and personal development.

Academic Integrity Statement
We treat you as adults who are honorable people. If special problems come up, see your instructor, ASAP.

*Academic dishonesty assaults the basic integrity and meaning of a University.* Cheating, plagiarism, and collusion are serious acts that erode the University's educational role and debase the learning experience not only for perpetrators, but also for the entire community. It is our expectation that students in ES105 will understand and subscribe to the ideal of academic integrity and that they will bear individual responsibility for their work. Materials (written or otherwise) submitted to fulfill academic requirements must represent a student's own efforts. *Any act of academic dishonesty attempted by any UCSB student is unacceptable and will not be tolerated.* This does not mean you can't talk about your work with other students and brainstorm, etc., but when it comes to *doing* your work, it must be your own. We encourage Students, TAs and Faculty to interact as much as possible on academic subjects of mutual interests.