

**FSEM 1111-87**  
**Can we live sustainably?**  
**Autumn 2011**

**Instructor Information**

Dr. Keith Miller  
Chemistry and Biochemistry  
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**Class meetings:** MW 12:00 – 1:50 PM, JMAC 141  
**Final Time:** November 21, 2011; 12:00-1:50PM, JMAC 141  
**Office hours:** By arrangement

**Required Course Items**

- Texts: Taylor, R.W. (2012) *Taking Sides: Clashing Views in Sustainability*, McGraw Hill, available at the DU Bookstore; MacKay, D.J.C. (2009) *Sustainable energy – without the hot air*, UIT Cambridge, available free online; McDonough, W and Braungart, M. (2002) *Cradle to cradle: remaking the way we make things*, North Point Press, this text will be provided by instructor during quarter.
- An inexpensive calculator is required. It should have the capabilities for square roots, logarithms, and exponential (scientific) notation operations. You are responsible for understanding how to perform each of the operations on your calculator. **Remember to bring a calculator (or laptop) with you to every class.**
- You will be required to read the Tuesday edition of *The New York Times*, specifically the science section. As students, you can receive a copy of this paper free around campus.

**COURSE DESCRIPTION**

The most recent estimates by the United Nations project that World population will exceed 10 billion people by 2100. This growth in population will continue to stress world food, water and energy resources. Science and technology will play an important role in alleviating the stress in each of these areas as the world struggles to accommodate this rapid growth. But what really is sustainable science? Can we sustain this growth by growing vegetables on front lawns, or by raising goats and chickens in the backyard? Can we harness the sun to power the homes of 10 billion people? In this seminar, students will investigate the physical, chemical and biological principles that are central to these resources. A major component of this seminar will be designing, building and testing a pilot water treatment and/or aquaponic systems.

## **CLASS MEETINGS**

The seminar will be predominately conducted in an active-learning environment. Students are expected to come to each class prepared to discuss the assigned topic and participate in integrated activities. These activities will include discussions, exercises and laboratory experiments that have been specifically designed to re-enforce the course material. I will also lecture on material that may not be found in the assigned readings. I frequently will ask you to work with other students to solve problems or answer questions. I encourage you to make the most of these interactions. Experience has shown that other students often succeed in describing concepts where professors and instructors fail. Group participation is expected, and thus portions of these group activities will be graded.

**Class attendance and participation is mandatory.** A significant portion of your final grade will be assigned to both attendance and participation. In regard to attendance, you will be allowed one (1) **unexcused** absence for the quarter. Every unexcused absence after that will result in the automatic lowering of one grade level (e.g., A to A-). The instructor will approve certain excused absences. Examples of excused absences include authorized, university-sanctioned events (athletics, theater events, etc.), severe illness, bodily injury or severe illness or death of a family member.

## **READINGS AND DAILY ASSIGNMENTS**

Assignments for each topic will be completed prior to class. These assignments will be from the assigned texts or supplemental material. When a reading is assigned, you are expected to come to the next class prepared to discuss the material. To facilitate these discussions, you will be required to turn in a typed paragraph describing your reaction to the assigned reading (when appropriate), and three (3) thoughtful questions. The paragraph **should not** merely be a summary of the material. Each of these daily assignments will be evaluated and returned to the student. One of the goals for this seminar is to help each of you learn how to critical evaluate a piece of scientific writing and convey your evaluation in a concise, written manner. I therefore expect you to improve throughout the quarter, and the grading of these short assignments will be reflective of this expectation.

## **QUIZZES**

I will periodically give a brief quiz at the beginning of the period. The quiz will be unannounced, but you will be able to use any notes you have taken while reading your assignments. You will not, however, be able to reference the text of the assigned reading during the quiz.

## **WRITING ASSIGNMENTS**

In addition to the daily preparations for discussion, there will be a total of three (3) writing assignments. First, you will be required to attend a minimum of one (1) sustainability event of campus and write a “review” of the event for credit. Second, you will also be required to write a “press release” to summarize the group/class sustainability project. Finally, you will pick a topic, develop an outline, and write an annotated bibliography on sustainability topic related to the course material.

## PILOT SUSTAINABILITY PROJECT

Student teams will be assigned to work on a pilot project related to sustainability. Early in the quarter, teams will first evaluate relevant water, food and energy issues of importance to developing countries. Based on these evaluations, the teams will write a proposal to build a system related to one of these areas. The project will be a “guided” one; thus, the instructor will provide specific challenges that face small communities in developing countries. More details will be provided the second week in class.

## EXAMS

Two (2) exams will be given during the quarter. They will occur during week 5 and the final examination period. The format for the exams will be provided the third week of the course. NO MAKE-UP EXAMS WILL BE GIVEN. If you will be out of town for a University sanctioned function (e.g., athletic team or music group), you are responsible for making arrangements with Dr. Miller at least one week in advance to complete the exam ahead of the due date.

## GRADES

At the end of the quarter, you will be graded according to your performance on the assigned work, class attendance, and class participation. I encourage teamwork; thus, I grade on an absolute scale. The percentage contributions of each component to your final grade are as follows:

Class attendance	<i>see earlier guidance</i>
Class participation/Quizzes	20%
Sustainability Project	30%
Writing Assignments	20%
Exams	30%
Total	100%

Your final grade will be determined by the following scale:

	A		B			C			D		
Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
Percentage minimum	95	90	86	82	77	74	70	65	61	57	55

## DINNER WITH THE CHANCELLOR

Every Autumn quarter, Chancellor Coombe hosts all first-year students and their mentors for dinner in the Gottesfeld Room at the Ritchie Center. The dinner is from 6:00 to 8:30 PM, and is a great experience. Please plan to attend the event. If you cannot attend on our assigned date, another date that fits your schedule can be arranged. **Our date is September 20, 2011. Please mark it on your calendars now!!** You will be receiving an invitation very soon. **PLEASE RSVP** immediately.

**CELLULAR PHONE, PAGER AND LAPTOP POLICY.** I respect the need for each individual to stay in contact with family and friends. The use of cellular phones and pagers, however, is disrupting to the learning environment. Thus, I request that the ringers of all cellular phones and pagers be muted during class. If an emergency arises, and you need to make a call on your phone, I request that you quietly leave the room and conduct your conversation out in the hallway. Laptops can be quite disrupting in class; therefore, ONLY laptops used for taking notes will be allowed. If you use your laptop, I might request that a copy of your notes be emailed to me at the end of class.

**LECTURE AND TESTING ACCOMODATIONS.** I will make every effort to accommodate students diagnosed with a learning disability. I will do this in complete confidence. I do, however, request that any student requiring these accommodations inform me the first week of class. For further information, please see the University Disability Services' website at <http://www.du.edu/disability/dsp/index.html>.

**ACADEMIC DISHONESTY.** While I advocate collaborative learning and teamwork, I also firmly believe that each individual should maintain the highest ethical standards in all of life's endeavors. As such, I support and will strictly enforce the Honor Code of the University of Denver. For your reference, I have included the link to the Honor Code Statement at <http://www.du.edu/ccs/honorcode.html>.

### **Tentative Course Outline**

Week 1	Introduction; Discoveries assessment Sustainability; climate change; <i>Taking Sides</i> reading
Week 2	World Energy resources; Renewable energy sources
Week 3	World Water resources; <i>Taking Sides</i> readings Discussion on <i>Water Wars</i>
Week 4	World food resources GMO foods; organic farming; "eat local" movement
Week 5	Aquaculture; waste Exam 1
Week 6	Lab experience: pilot projects <i>Taking Sides</i> readings
Week 7	Lab experience; pilot projects Discussion of <i>Cradle to Cradle</i>
Week 8	Lab experience: pilot projects <i>Taking Sides</i> readings
Week 9	Lab experience: pilot projects <i>Taking Sides</i> readings
Week 10	Lab experience: pilot projects Concluding thoughts; Review
Final	Exam 2; November 21, 2011; 12:00-1:50PM.