



Chemical Innovations for a Sustainable Future
CHEM 494 (Seminar, 1.0 credit)
Spring 2011
Loyola University Chicago

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Class Meeting Times: Tuesdays, 7:45-8:35 pm - Cudahy Science 314 and online

Course Description

Early philosophers thought that four elements made up all matter: air, earth, fire, and water. Modern chemistry has extended and enhanced our understanding of matter since that time, but, ironically, in the current age we have reason to return to thinking about those original four elements: will they remain available to support the survival of many species of organisms and ecosystems?

This seminar course will explore the issues surrounding sustainability and the simultaneous call and role of chemistry research and practice for ensuring a sustainable future.

Required Resources

- (1) McDonough, W. & Braungart, M. (2002). *Cradle to Cradle: Remaking the Way We Make Things*. New York, NY: North Point Press
- (2) Selected media from academic journals, news, movies, etc.

Relation to the School of Education's Conceptual Framework

This course adopts aspects of the Loyola University Chicago School of Education's conceptual framework, *Professionalism in Service of Social Justice*. Particularly, this course helps students expand their knowledge of literature/research (CF1), develop skills for use in a variety of settings (CF2), advance their professional decision-making in areas of social justice and service (CF6), consider the role of scientific research in moral and ethical decision-making (CF7), and apply ethical principles in professional decision-making (CF8).

Academic Honesty

Academic honesty is the cornerstone of any university and of the way in which scientists do research. It is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. Academic dishonesty is one of several possible reasons why a student may be dismissed from the program and the University. For specific policies and procedures see: http://www.luc.edu/education/academics_policies.shtml#honesty

Accessibility

Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: <http://www.luc.edu/sswd>

Harassment

It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. For specific definitions of discrimination, abuse, and harassment refer p. 25-26 in the Loyola University Chicago Student Handbook, located at:

<http://www.luc.edu/studentaffairs/pdfs/LoyolaStudentHandbook2006.pdf>

If you believe you are subject to such harassment, you should notify your instructor. If you believe you are subject to harassment by your instructor, contact the Associate Dean of Academic Affairs at 312-915-6464.

Safety

Students must adhere to proper safety protocols and practices when conducting classroom activities and laboratory investigations. A separate agreement describing these practices must be signed before a student may participate in coursework.

Course Evaluation

Grades will be assigned in the course according to the following sources:

Criterion	Maximum Percent Value
<i>CHEM 494 – Seminar (1.0 credit)</i>	
Class Participation & Media Assignments	40 %
Content Problem Sets	25 %
Lesson Integrations	35 %

Class Participation & Media Assignments will be an important part of our regular work. This source of evaluation will primarily comprise various media (readings, A/V, etc.) with online reflection questions and/or application activities. Media and assignments will be posted to Blackboard each Friday of the semester. Due dates will be specified with each assignment. The two lowest scoring assignments in this category will be dropped from the final percentage calculation.

Content Problem Sets will involve the use of content, concepts, and skills from CHEM 495, 496, and 497 in the context of sustainability or environmental issues or problems. These sets are take-home problems. While collaboration is encouraged to generate ideas, final submitted solutions must ultimately be the result of your own unique effort, work, and analysis. . Problems sets will be posted to Blackboard on February 4, March 4, and April 8. Due dates will be specified with each problem set.

Lesson Integrations will involve each student designing lesson plans related to specific chemistry content and the incorporation of an assigned area of sustainability. Plans will be assessed according to rubrics that have been established in other coursework.

Primary focal areas for these assessments include: does the lesson plan:

- state the primary learning objective(s). These objectives should be aligned to an established set of standards for learning chemistry. They also should be clear, achievable, and measurable;
- identify at least one common misconception relating to the primary learning objective that the lesson will help students address;
- include activities that elicits students' current knowledge about the topic;
- incorporate essential features of classroom inquiry for meaningful learning, and;
- utilize appropriate tools to measure student learning of the primary concepts.

Lesson Integration I is due **March 15, 2011**.

Lesson Integration II is due **May 3, 2011**.

Practices for Success

Supporting claims with evidence, making applications, solving and analyzing problems, and using chemical principles to explain phenomena are critical skills in the field of chemistry. The development of these skills is not without some frustration, but it carries the reward of deepening one's ability to think critically and solve problems in any field. To do this, one may have to assess, evaluate, and possibly revise approaches to learning. The use of targeted, guiding questions, regularly scheduled work, and strategic study plans can greatly assist the learning of learning chemistry. With such a focus, hopefully any frustration will quickly turn to appreciation and fascination for the relevance and connectedness of chemistry in your life and the world around you. Solving and analyzing problems is the most important feature of this work. If, at any time, you need assistance framing such plans for your work in chemistry, please do not hesitate to ask the instructor.

Norms of Course Proceedings

The classroom is to be a safe place to question and explore ideas. Student and teacher voices are important to this work. Collegial disagreement can be a healthy part of this process, but must always include respect for all members of the class.

Course activities will be designed to help students reach the goal of learning chemistry content and developing thinking skills. This will more often be driven by the use of data and reasoning to discover concepts and solutions rather than the identification and exchange of chemical facts and algorithms.

Class sessions will begin and end on time. All students should attend class regularly and participate in class discussions. Multiple absences could affect one's ability to learn chemistry during this semester. Anticipated absences should be discussed with the instructor two class days before the absence. Proper documents may be requested to verify the reason for any absence. This is particularly relevant to days missed that include an in-class assessment for which a student is asking for a make-up.

Cell phones and the use of texting devices should be used in appropriate and professional manner. These devices should not distract other participants in the course.

Email messages among students in the course should also be respectful, appropriate, and professional. Response time to email messages is acceptable within three days.

Completed course assignments must be submitted by 9:00 pm on the due date. Late assignments may not be accepted without proper verification of reasons.