

AGRI-ENGR 601
Bioenergy Technology
Fall 2012

Schedule: Mondays 9:00–10:50, Wagar 107B
Wednesdays 9:00–10:50, Guggenheim 107 or other location (laboratory)

Instructors:

Daniel R. Bush, Department of Biology (D.Bush@ColoState.edu)
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Kenneth F. Reardon, Department of Chemical and Biological Engineering (Kenneth.Reardon@ColoState.edu)
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Course Description:

This course is a core element of the NSF-funded Integrative Graduate Education and Research Traineeship (IGERT) program in Multidisciplinary Approaches to Sustainable Bioenergy (MAS BioEnergy). The goal of the MAS BioEnergy program is “to prepare PhD graduates who are trained as interdisciplinary scientists with a full understanding of the technical challenges facing the emerging bioenergy industry”; i.e., to educate PhD students in a way that they have an understanding of the entire spectrum of bioenergy topics and that they incorporate more than one discipline in their PhD research.

This course facilitates that goal by providing an in-depth survey of biofuels/bioenergy production, including the production of biomass (algae and plants); conversion of that biomass to fuels, chemicals, and energy; characterization of biofuel properties in engines; and economic and environmental assessment of these biofuel/bioenergy production processes. The course will consist of lectures, discussions, and laboratory demonstrations and experiments. A subsequent course will focus on bioenergy sustainability and policy issues.

Both the topics and the student population for this course span several disciplines, and thus every student in the course will encounter topics for which they do not have formal educational preparation. The instructors will address this issue by (a) providing lists of recommended background articles and books, (b) having students work in teams with representation from different educational backgrounds, and (c) focusing on topics that integrate topics rather than those that require specialized knowledge (since those are normally found in single-discipline courses).

Text and Additional Class Material:

There is no required text. Supplemental reading, including current journal articles, will be provided.

Course Objective(s):

The objective of this course is to provide students with knowledge of bioenergy production technologies and issues. Upon completion of the course, students will

- understand the primary science and engineering aspects of biomass production, biomass conversion, and biofuel properties;
- understand the issues involved in environmental and economic assessment of bioenergy production; and
- be able to use life cycle assessment software to analyze the sustainability of biofuels production scenarios

Instructional Methodology:

The class will meet as a group two days per week for a lecture and group discussion. Once per week, the class will meet in a laboratory for an active demonstration and/or experiment. Homework assignments will involve the analysis of journal articles, the use of computer resources to develop models, and a semester project.

Methods of Evaluation:

Homework	30%	
Reading notebooks	40%	(see separate description)
Semester project	30%	(see separate description)