

Biofuels, Spring 2016

2:00-3:15 PM, TR, 3050 Palmer Hall

Chemical and Environmental Engineering Department, University of Toledo

Aims

The aims of this class are to develop an understanding of the technical, economic, social, and political issues associated with energy consumption and the potential for biofuels to replace current energy sources. Specific goals are to learn:

- 1) Tools for analyzing energy consumption and production,
- 2) How society consumes energy,
- 3) Current processes for biofuel production (corn ethanol, vegetable oil-derived biodiesel, biogas from anaerobic digestion),
- 4) Biochemical methods for fuel production from lignocellulosic biomass,
- 5) Chemical methods for fuel production from lignocellulosic biomass,
- 6) Thermochemical methods for fuel production from lignocellulosic biomass alternatives to ethanol,
- 7) Biofuels from microalgae.

At the conclusion of this class, you should be able to answer the question: Are biofuels a viable alternative to petroleum?

Textbook

No textbook

Instructor

Sridhar Viamajala, 3060 Nitschke Hall, (419) 530-8094, sridhar.viamajala@utoledo.edu

Office Hours

W 1-2pm or by prior appointment

Grading

The point total will consist of a sum of the following items:

Attendance	20%
Homework and Quizzes	30%
Mid-term	20%
Final Exam	30%

Suggested Readings

1. CM Drapcho, NP Nhuan and TH Walker. Biofuels Engineering Process Technology. McGraw Hill. 2008.
2. DM. Mousdale, Introduction to Biofuels, CRC Press, Boca Raton, 2010.
3. RC Brown and TR Brown. Why Are We Producing Biofuels. Brownia LLC. 2012
4. DJC MacKay, Sustainable Energy- without the hot air, <http://www.withouthotair.com/>.
5. America's Energy Future: Technology and Transformation (read online: http://books.nap.edu/openbook.php?record_id=12091&page=1).
6. Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy (read online: http://www.nap.edu/openbook.php?record_id=13105&page=1).
7. Water Implications of Biofuels Production in the United States (read online: http://www.nap.edu/openbook.php?record_id=12039&page=1).
8. Fields of Fuel: Market and Environmental Implications of Switching to Grass for U.S. Transport (download PDF: <http://www.wri.org/publication/fields-of-fuel>).
9. Plants at the Pump: Reviewing Biofuels' Impacts and Policy Recommendations (download PDF: <http://www.wri.org/publication/plants-at-the-pump>).

10. Corn Stover for Ethanol Production: Potential and Pitfalls (download PDF: <http://www.wri.org/publication/corn-stover-for-ethanol-production>).

Suggested Resources

1. www.wikipedia.com
2. www.eia.gov
3. www.doe.gov

Policies and Procedures

Attendance

Class attendance and participation is mandatory. One point (out of a maximum of 20) will be deducted for each unexcused absence.

Quizzes

Quizzes will be given roughly one every 3 weeks.

Academic Dishonesty

Academic dishonesty will not be tolerated. Students are responsible for knowing what constitutes academic dishonesty. Examples of academic dishonesty are provided on the Provost's web site (http://www.utoledo.edu/catalog/2000catalog/admissions/academic_dishonesty.html) but the instructor should be consulted if questions arise. Violations may result in a failing grade for an assignment or test, a failing grade for the course, or suspension from the University.

Students with Disabilities

The University of Toledo offers various accommodations and services to individuals with qualifying disabilities. Please refer to the Office of Accessibility for qualification guidelines (<http://www.utoledo.edu/utlc/accessibility/index.html>).