

**Our Energy Future - BIBC 140**  
**Introduction to renewable energy and biofuels**  
**Course Syllabus – Spring 2016**

**Prerequisites:**

BILD 1 & CHEM 6A

**Course Description:**

This course examines current energy production and use and introduces alternative energy technologies for creating a sustainable future. It provides an overview of existing energy utilization, production and infrastructure, and covers the consequences of our energy choices on the environment and our health. The course also discusses the relationship between energy and food and water, and how energy impacts their production and delivery. We then introduce the growing field of renewable and alternative energy including solar, wind, nuclear, and biofuels. The course then focuses on various biofuel feedstocks and technologies, examining the chemistry; biology; and the biochemical, genetic, and molecular approaches being developed to advance the next generation of biofuels. Overall the course emphasizes the importance of developing biofuel as a contributing replacement for the diminishing supplies of fossil fuels, and on reducing the consequences of carbon dioxide release into the environment – ultimately creating a sustainable energy future.

**Course Goals/ Learning Objectives:**

- 1) Students will recognize the types and differences between existing energy resources, understand their procurement and utilization, and their impacts on society and the environment.
- 2) Students will be knowledgeable of the existing and potential future sources of renewable energy, and be able to intelligently analyze reported aspects of the energy and renewable energy fields.
- 3) Students will be introduced to the scientific literature, and will learn to interpret the mass media presentation of energy issues, and be able to access the primary scientific literature to help make informed decisions on renewable energy choices.

**Lectures:** This class is scheduled for M-W-F from 2 to 2:50. The class will have a total of 30 hours of lectures, and one third of the lectures have been pre-recorded and can be viewed at any time by students enrolled in the class. There will be several lectures and discussions that are NOT pre-recorded and these will be given on Mondays and Wednesday, and these will be recorded for podcast. In addition, there will be two mid-terms and these will also be on Wednesdays (April 20 and May 18), and a final on June 10. The lectures scheduled for each week are listed by the day, but lectures listed for Friday are pre-recorded and will not be given in class, only on TritonEd. Friday class time will be available for any questions and discussion.

**Sections:** Students are REQUIRED to sign up for a section and to attend those section for 1 hour each week.

**Quizzes:** During each section there will be a short quiz focused on the journal paper(s) assigned the previous week. Note: These journal papers will be posted on TritonEd. There will be 8 quizzes total, and there are no make-ups for missed quizzes. You can miss one quiz without any impact on your overall grade, as the lowest quiz grade will be dropped.

**Final Project:**

*What is your carbon footprint?*

Tell us why and how you might be able to use sustainable energy to make it better.

Details will be provided during Section.

**Grading:**

40% Midterm Exams

    20% midterm 1

    20% midterm 2

30% Final Exam

30% Section Activities

    15% Quizzes

    15% Carbon footprint

**Textbook:**

Our Energy Future an introduction to renewable energy and biofuels Jones and Mayfield.

**BIBC 140 SP16 Course Schedule:**

Day	Topic	Book Chapter	Date
1	Introduction to Renewable Energy	1	March 28
2	History of fossil fuel and future prospects of fossil fuel	2	March 30
3	<i>Energy by the Numbers (Murphy)</i> <i>Introduction to Energy (Mayfield)</i>		April 1
4	Climate Change	3	April 4
5	Renewable Energy Sources	4	April 6
6	<i>The Future of Nuclear-based Energy Sources (Tynan)</i> <i>Electric vehicles, Smart grid and energy storage (Torres)</i> <i>Wind Power and Turbine Technologies (Bazilevs)</i> <i>Photovoltaic and Photothermal Energy Production (Coimbra)</i>		April 8
7	Industrial Agriculture	5	April 11
8	Renewable Fuels Biological Sources	6	April 13
9	<i>Energy and Modern Agriculture (Briggs)</i> <i>Climate Change and Food Security (Burney)</i>		April 15
10	First Generation Biofuels – Corn and Sugarcane Ethanol	7	April 18
11	1 <sup>st</sup> Mid-term Exam		April 20
12	<i>Corn ethanol (Smith)</i>		April 22
13	Biodiesel Chemistry and Analysis (Pomeroy)	7	April 25
14	Second Generation Biofuels – cellulosic ethanol (Joe Ostrand)	7	April 27
15	<i>Alternative Sources of Biomass Jatropha (Schmidt)</i> <i>Cellulosic ethanol commercialization (Rubino)</i>		April 29
16	Aquatic Biomass – Cyanobacteria, Diatoms & Algae	9	May 2
17	Production Processes for Biofuels from Algae	9	May 4
18	<i>Production Process for Biofuels from Algae (McBride)</i>		May 6
19	Synthetic biology for enhanced biofuel production	10	May 9
20	Biogas and Biohydrogen	8	May 11
21	<i>Biogas (Hein)</i> <i>Thermochemical Conversion of Biomass to Fuel and Electricity (Herz)</i>	11	May 13
22	Nutrient Utilization and Recycling and Water Use	12	May 16
23	2 <sup>nd</sup> Mid-term Exam		May 18
24	<i>Water and Climate Change in California (Cayan)</i> <i>Biofuels water and the environment (Mayfield)</i>		May 20
25	Life Cycle Assessment	13	May 23
26	Economic of Energy	14	May 25
27	<i>Economics of Energy (Graff Zivin)</i>		May 27
28	Memorial Day		May 30
29	Politics and Policy of Energy	15	June 1
30	<i>Importance of Energy for the Bottom Billion (McCord)</i> <i>Energy Services for the Remote Communities of Nepal (Zahnd)</i> <i>The International Politics of Climate Change Outline (Victor)</i>		June 3
30	Final 3:00 – 6:00 pm		June 10