

FSC 401
INTRODUCTION TO FUEL TECHNOLOGIES

Fall 2015

T R 2:30-3:45, 151 Willard Building
Dr. L. R. Radovic, Professor of Energy and Mineral Engineering
205 Hosler Building, 863-0594, LRR3@psu.edu
Office Hours: 24/7 by e-mail or skype, or by appointment
Web site: www.ems.psu.edu/~radovic/IntroFuelTech_2015.html

<i>Date</i>	<i>Topic</i>
8/25	Fuels: supply (guided self-study)
8/27	Fuels: demand (guided self-study)
9/1	Fuels: environmental impact
9/3	Fuels: laws of conversion
9/8	Fuels: efficiency of conversion (1)
9/10	Fuels: efficiency of conversion (2)
9/15	Coal: science
9/17	Coal: technologies
9/22	Petroleum: science
9/24	Petroleum: technologies
9/29	Natural gas: science
10/1	Natural gas: technologies
10/6	Fossil fuels and the environment: NO _x and SO _x
10/8	Fossil fuels and the environment: PM ₁₀ , PM _{2.5} , VOCs, CO _x
10/13	Fossil fuels and the environment: smog
10/15	Fossil fuels and the environment: greenhouse gases
10/20	Fossil fuels and the environment: clean(er) technologies
10/22	Nuclear energy: science
10/27	Nuclear energy: technologies
10/29	Renewable fuels: overview
11/3	Renewable fuels: technologies
11/5	Fuels demand: residential comfort
11/10	Fuels demand: electricity (1)
11/12	Fuels demand: electricity (2)
11/17	Fuels demand: transportation (1)
11/19	Fuels demand: transportation (2)
12/1	Summary: energy economics
12/3	Summary: energy policies (and just a tiny bit of politics)
12/8	Discussion of contemporary issues (1)
12/10	Discussion of contemporary issues (2)

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A. Required Reading/Resources

- a physical chemistry textbook (or a physics and a chemistry textbook)
- daily and weekly press, popular science magazines
- “Energy and Fuels in Society: Analysis of Bills and Media Reports”
(www.ems.psu.edu/~radovic/matsc101.html)
- www.eia.doe.gov, www.epa.gov, ‘smart’ google searches, etc.
- occasional hands-on evening lab sessions to help with the use of software in solving problems

B. Tests

We shall have two evening or take-home tests (13% each) plus the final exam (during the week of the finals, 20%). The pros and cons of evening *vs* take-home test will be discussed in class, and a majority-vote decision will be taken at least one week prior to each test.

C. Quizzes: five (5% each), three of which will count toward the final grade.

D. Homeworks

The homework (whose contribution to the final grade is shown in parentheses below) is due in Angel dropbox on the day indicated.

<i>Homework</i>	<i>Topic</i>	<i>Date Due</i>
1	Analysis of fuel supply: conversion and efficiency (8%)	September 20
2	Analysis of fuel supply technologies (8%)	October 18
3	Fuels/environment on the WWW (7%)	November 8
4	Analysis of fuel demand technologies (8%)	November 22
5	Analysis of media reports (8%)	December 6

Homeworks 1-4 are meant to be *individual* efforts.

Homework 5 is a *group* effort. Your team (tbd) should do the following:

- follow the press (*New York Times*, *Wall Street Journal*, *Economist*, *Time*, etc.)
- make clippings of fuels-related articles and, especially, keep track of the numbers in them
- select three articles, each one of which discusses mainly one the following topics:
 - energy supply issues
 - environmental effects of fossil fuel utilization
 - energy demand issues

Discuss the selected articles, especially their quantitative aspects, prepare a concise written report (maximum six double-spaced typed pages, two for each article).