

**GEOS 190 Energy and the Environment (Q Course)**  
**Spring Term 2020**

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Office Hours: If you would like to meet with me, sign up for an appointment on the scheduling sheet that is posted each week on my office door. You also are welcome to drop by my office in the afternoons even if you have not scheduled an appointment.

Class: 12:40-2:10 p.m., TTh, Rm. 223, Julian S&M.

Text: Energy, Environment, and Climate, 3<sup>rd</sup> edition by Richard Wolfson, 2018. W. W. Norton & Company, New York. ISBN 9780393622911.

**Course Outline and Tentative Schedule**

<u>Week</u>	<u>Dates</u>	<u>Topic</u>	<u>Reading Assignment</u>
1	1/28, 1/30	Origin and History of Earth	Ch. 1
2	2/4, 2/6	High-Energy Society	Ch. 2
3	2/11, 2/13	Energy Mechanics	Ch. 3
4	2/18, 2/20	Energy and Heat	Ch. 4
<b>EXAM I: Thursday, February 20</b>			
5	2/25, 2/27	Energy and Heat	Ch. 4
6	3/3, 3/5	Fossil Fuels	Ch. 5
7	3/10, 3/12	Fossil Fuels	Ch. 5
8	3/17, 3/19	Environmental Impacts of Fossil Fuels	Ch. 6
<b>EXAM II: Thursday, March 19</b>			
<b>Spring Break: Saturday, March 21 through Sunday, March 29</b>			
9	3/31, 4/2	Nuclear Energy	Ch. 7
10	4/7, 4/9	Solar Energy	Ch. 9
11	4/14, 4/16	Water, Wind, and Biomass Energy	Ch. 10
12	4/21, 4/23	Geothermal and Tidal Energy	Ch. 8
<b>EXAM III: Thursday, April 23</b>			
13	4/28, 4/30	Energy Carriers: Electricity and Hydrogen	Ch. 11
14	5/5, 5/7	Climate	Ch. 12 & 14

**FINAL EXAM (Comprehensive): Thursday, May 14, 1:00-4:00 p.m.**

**The Topic**

The era of cheap, abundant energy provided by fossil fuels will end during your lifetime. Major changes in human society will occur as we strive to make the transition from non-renewable, polluting fossil fuels to renewable and sustainable alternatives. Some very smart people doubt that we can make this transition and predict that modern industrialized societies will begin to collapse in the not too distant future. Others believe that technological innovation, that has been the hallmark of human existence, will enable us to make this transition successfully. Whatever the outcome, make no mistake about it, the way we live, work, play, and interact is going to change drastically during this century. This is an interdisciplinary topic. It

involves science, mathematics, politics, economics, sociology, demographics, and many other disciplines. No matter what your interests are, you have to be interested in this.

The present energy landscape is changing rapidly. Emerging economies, particularly in China and India, are consuming an increasing supply of the world's energy resources that are presently provided mostly by nonrenewable fuels (oil, coal, natural gas, and uranium). Most of the increase in demand for energy during the next 30 years will come from developing countries. Although progress has been made in the development of renewable energy resources, new technologies such as horizontal drilling and hydraulic fracturing ("fracking") have opened up vast new reserves of relatively cheap natural gas and oil that were previously thought to be inaccessible. Whereas this may bode well for energy security for the near future, the environmental consequences of continuing to rely mostly on fossil fuels for our energy to power modern industrialized economies could be disastrous.

### **Course Objectives**

After completing this course, you should know...

- ✓ the present sources of energy and how different energy sources are used in industrialized societies.
- ✓ how energy resources form and the difference between renewable and nonrenewable energy resources.
- ✓ the difference between an energy source and an energy carrier.
- ✓ the environmental impacts of using energy resources.
- ✓ the facts about climate change.
- ✓ how to do basic calculations related to energy resources and the environment.
- ✓ future scenarios for energy resources and sustainable societies.

### **Grading**

Your course grade is based on your class participation, three semester exams, and a comprehensive final exam. These components are weighted as follows:

Participation	10%
Exam I	20%
Exam II	20%
Exam III	20%
Final Exam	30%

A =  $\geq 90\%$ ; B = 80-89%; C = 70-79%; D = 60-69%; F =  $< 60\%$

(Note: I will lower these ranges slightly if warranted by the class grade distribution.)

### **Q Certification**

You must receive a course grade of at least a C- to receive Q certification.

### **Class Policies**

1. It is the policy and practice of DePauw University to provide reasonable accommodations for students with properly documented disabilities. Written notification from Student Accessibility Services is required. If you are eligible to receive an accommodation and would like to request it for this course, please contact Student Accessibility Services. Allow one week advance notice to ensure enough time for reasonable accommodations to be made. Otherwise, it is not guaranteed that the accommodation can be provided on a timely basis. Accommodations are not retroactive. Students who have questions about Student Accessibility Services or who have, or think they may have, a disability (psychiatric, attentional, learning, vision, hearing, physical, medical, etc.) are invited to contact Student Accessibility Services for a confidential discussion. Student Accessibility Services is located in Union Building Suite 208 and can be reached by phone at 765-658-6267.
2. Regular and punctual attendance is expected. Poor attendance and preparation for class will result in refusal on my part to give you reasonable attention and guidance in make-up work. I realize that an occasional absence is necessary, particularly if you are sick. You also may need to miss class because of

an extracurricular activity that contributes to your overall education, career objective, or well-being (e.g., field trip for another class, job interview, professional conference, workshop participation, doctor appointment, student-athlete participating in a sporting event). Send me an e-mail message either before or soon after you miss class so that I know the reason for your absence. See the Student Handbook (p. 103) for the University policy on attendance:

<https://www.depauw.edu/handbooks/academic/#Toc4590181133>.

3. Computer use during class is not allowed. Put it away. Cell phone use during class for any reason other than class participation also is not allowed. Set your cell phone to silent and leave it on the table in front of you until you are instructed to use it. Place it back on the table when we are finished. There may be rare instances where you might need to use your phone during class (e.g., illness in the family; potential employer). Alert me before class starts that you are expecting an important call and you may leave class when you need to use your phone.
4. Food is not allowed in the classroom; however, you may bring a beverage to class. Please clean up the table and your seating area after class so that the area is clean for the next person to use the seat.
5. Remain in your seat throughout the class session. Use the restroom before you come to class, and avoid moving about the classroom during class. In rare instances, you may need to visit the restroom during class. Please feel free to do so without asking, but don't make it a daily habit.
6. Make-up examinations are normally not given; however, I will consider requests for make-up exams on a case-by-case basis. Students who have legitimate conflicts (e.g., travel for athletic events or other extracurricular activities) should consult with me well in advance.
7. Academic dishonesty is not tolerated. Academic dishonesty includes, but is not limited to, cheating, fabrication, facilitating academic dishonesty by another student (e.g., allowing another student to copy your answers on a test), and plagiarism. Use of any electronic device other than a calculator during exams is not permitted and is automatically considered cheating. All students should read and understand DePauw University's Academic Integrity Policy, which may be found at:

<https://www.depauw.edu/handbooks/academic/#Toc459018101>

Violations will be handled in accordance with established University procedures as described in the Academic Integrity Policy.

***If you feel lost or frustrated with any aspect of this course, please talk to me so that we can work together to resolve your difficulties.***