

Course Syllabus: EGY 105 – Energy in Our World

Summer 2026

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Context for the course

Energy is a vitally important part of the universe and impacts our lives on a moment-by-moment basis. Essentially every branch of science deals with energy in some way. It is an integral part of the laws of physical motion, chemical reactions, and biological processes for cells, organisms, and ecosystems.

Most people rightfully think of energy as something that we have to purchase to power our vehicles, heat, cool, and light our homes, and run our computers and appliances. We normally don't think about energy unless it becomes unavailable, or the price increases sharply – as we are now experiencing due to the war in the Middle East and the closure of the Strait of Hormuz.

Since the 1970s, energy issues have been covered in the media, and they are frequently controversial. We depend upon sources like coal, oil, and nuclear to power our modern lives. But yet, each poses well publicized risks to health and the environment. For example, extracting and burning fossil fuels (coal, oil, and natural gas) releases carbon dioxide and methane into our atmosphere, causing changes to our climate. And nuclear fission produces nuclear waste, as well as the risk of catastrophic accidents. In the meantime, thanks to stories in the media, many people believe that we must switch to alternative energy sources (wind, solar, geothermal, hydropower). But at present, they don't have sufficient output to power our modern lives. Energy also must be transported from point of production to point of consumption via power-lines, pipelines, tanker, truck, or rail – all posing some risk. Many people are concerned that we waste energy, and that we need to engage in strict conservation.

For those reasons, energy figures as a central topic in national and international discussions. In his first day in office in January 2025, President Trump signed several Executive Orders that support his goal to make the United States “Energy Dominant.” Since then, energy has been a dominant theme of his administration.

Despite its importance, there is a growing sense that we simply don't know enough about basic energy concepts to make intelligent decisions about how we produce, transport, or consume it. For example, a member of the US Congress recently criticized the increasing use of solar power, believing that she wouldn't be able to “turn on the lights” after the sun goes down (ignoring that other sources of energy are still available, and that it is possible to store energy in batteries).

There is a growing consensus that if we are to survive as a society, we must do more to improve *energy literacy* at all levels. EGY 105 aims to do that for Wilkes students, particularly for students majoring in areas other than the sciences and engineering (though those students are welcome as well).

Course Objectives:

Students completing EGY 105 will be able to:

- Understand the physical basis of energy in our universe, its importance in biological systems, and various ways in which it is measured.
- Understand essentials of electricity.
- Understand the science behind climate change.
- Understand the history of energy use both worldwide and in “developed” countries.
- Understand current trends of energy production and consumption locally, nationally, and worldwide.
- Critically evaluate arguments about the sustainability of fossil fuels and nuclear energy
- Learn and critically evaluate information about the benefits and weaknesses of potential sources of alternative energy from a variety of perspectives (potential energy yield, economic, environmental, sociopolitical)
- Examine how we can improve energy efficiency and reduce consumption
- Develop a well-reasoned personal philosophy about the present energy situation and whether we should move forward on developing and implementing alternative sources.
- Be able to interpret graphs and tables, especially as they relate to energy.
- Take more advanced courses that relate to energy at Wilkes or elsewhere.
- Understand employment opportunities that relate to energy.

Long-Term Objective

Students will develop a mature attitude about - and lifelong interest in - energy issues and will assert leadership on that topic long after the course is completed, whether as citizens or through careers that involve energy in some way.

Note: Past students of this course have gone on to hold elected office, obtain graduate-level degrees in energy, and otherwise make important decisions on energy-related issues. I hope the same will be true for the EGY 105 class of Summer of 2026.

Course theme:

Should renewables be an important part of the U.S.’s goal of becoming “Energy Dominant?”

EGY 105 as an Area II Elective:

EGY 105 qualifies as an Area II (the Scientific World) category of courses at Wilkes University by fulfilling several Student Learning Outcomes (SLOs). Those SLOs, and the way that they are met, are listed below.

Throughout the semester, students will:

- *Describe how science affects contemporary issues;*
 - Discussed throughout the course, especially the manner in which the world relies on different forms of energy to power our lives. Scientific research is used to provide us with more energy options, more efficiency, and safer forms of energy. Specifically met through lectures and readings – from which students will complete weekly assignments and exams.
- *Access sources of scientific information that are both relevant and reliable;*
 - Met by having students discover and evaluate relevant and reliable sources when putting together their weekly assignments.
- *Explain ethical issues in the practice of science;*
 - Students will discuss the ethics surrounding the use of fossil fuels and non-fossil alternatives (wind, solar, nuclear) through weekly assignments and periodic exams.
- *Communicate scientific concepts effectively;*
 - Accomplished by presenting clear answers to questions that have scientific relevance on the weekly assignments and exams.
- *Draw logical conclusions based on scientific data;*
 - Students are required to interpret graphs and tables during weekly assignments and exams.
- *Distinguish between scientific evidence and pseudoscience;*
 - During the weekly assignments and exams (especially the final), students will be asked to evaluate the scientific validity of information discussing different forms of energy. This will be done by having the students visit websites prepared by different stakeholders having divergent views of fossil fuels and non-fossil alternatives.
- *Explain the development of scientific theories using the scientific method.*
 - Students will discuss the role of science process and findings in comparing different forms of energy. From the information provided and uncovered during literature searches, will construct a science-based viewpoint of how to best conserve existing energy sources, as well as develop new energy sources.

EGY 105 – Schedule of Topics**(Note: additional readings will be provided throughout the course to supplement the text)**

<u>Lect. #</u>	<u>Topic</u>	<u>Text Reading</u>
<u>Week 1: 8-12 June</u>		
01.	Introduction - A brief history of energy; energy as a wicked problem	1-21
02.	Course syllabus – course policies, schedule, grading, etc. (no study guide)	
03.	Energy literacy	
Completed Study Guides due 15 June		
<u>Week 2: 15-19 June</u>		
04.	Energy concepts I – Velocity and acceleration	29-30, 37-41
05.	Energy concepts II – Force and energy	30-37, 41-67
06.	Energy concepts III – Conversions and efficiency	24-29, 69-92
07.	Heat I – Heat and temperature, water cycle	93-101
Completed Study Guides due 22 June		
<u>Week 3: 22-26 June</u>		
08.	Heat II – Forms of heat transfer	101-125
09.	Energy terminology – Biological dimensions	To be provided
10.	Introduction to electricity	305-358, 397-407
11.	Climate change	235-260
Completed Study Guides due 29 June		
<u>Week 4: 29 June - 3 July</u>		
12.	Coal	195-201, 218-224
13.	Petroleum I	201-209, 225-234
14.	Petroleum II	201-209, 225-234
Completed Study Guides due 6 July		
<u>Week 5: 6-10 July</u>		
Exam 1 (Lectures 01-11) Distributed 5 July- Due 8 July		
15.	Conventional natural gas I	209-218
16.	Conventional natural gas II	209-218
Completed Study Guides due 13 July		
<u>Week 6: 13-17 July</u>		
17.	Unconventional natural gas I	209-218
18.	Unconventional natural gas II	209-218
Completed Study Guides due 20 July		
<u>Week 7: 20-24 July</u>		
19.	Nuclear fission and fusion	415-486
20.	Solar power	155-194, 360-371
21.	Wind power	371-383
Completed Study Guides due 27 July		

(Continued next page)

Week 8: 27 July – 31 July

22. Hydropower	383-395
23. Geothermal	557-571
24. Biomass power I – Introduction	527-555

Completed Study Guides due 3 August

Week 9: 3-7 August

25. Biomass power II – Biodiesel	527-555
26. Biomass power III – Ethanol	527-555
27. Energy Conservation	127-154

Completed Study Guides due 10 August

Week 10: 10-11 August

Exam 2 (Lectures 12-27): Distributed 9 August - Due 11 August

Information delivery

Students will gain information by way of:

- Online presentations and study guides provided by the course instructor
- Course textbook
- Articles assigned by the instructor

Outside Information Sources

Textbook: Hinrichs, R.A. 2024. *Energy: Its Use and the Environment*. 6/e. Brooks / Cole Cengage Learning. General reading assignments from the text are provided above.

In addition, I will provide you with numerous readings (essays, websites) that address various energy issues – and will expect you to read those sources.

Assessment and Grading

Grading System (subject to change; students will be given fair notice of any changes):

Exams (2)	200 points
Weekly notes review, problem set	300 points
Total	500 points

Grades will be assigned as follows: $\geq 92\%$ = 4.0; 85-92% = 3.5; 80-85% = 3.0; 75-80% = 2.5; 70-75% = 2.0; 65-70% = 1.5; 60-65% = 1.0; $< 60\%$ = 0.0. These cutoffs may be adjusted downward.

Miscellaneous

E-mail: kenneth.klemow@wilkes.edu

Office Hours: Please email me with a request to meet. All meetings will be handled via Zoom. I will do my best to reply to your emails within a few hours.

Course webpage: <http://klemow.wilkes.edu/EGY-105Su.html> (please bookmark)

Facebook: <https://www.facebook.com/DrKlemow> (please friend me!)

LinkedIn: www.linkedin.com/in/ken-klemow-67756717 (please link to me!)

Instagram: Forget it, I really don't like Instagram

X: I used Twitter occasionally, but not since it was rebranded as X.

Other social media: Nope

Course Delivery:

While originally a face-to-face course, EGY 105 is now delivered using an Asynchronous Online format. To that end, lectures will be made available as recorded presentations on Panopto, available on demand through the course website (<http://klemow.wilkes.edu/EGY-105Su.html>). Note, I do not make much use of D2L. The website will have a suggested pace for the lectures throughout the semester. Thus, the recorded lectures replace face-to-face lectures

Whenever EGY 105 is offered during the Fall or Spring semester, the material is spread out over the fifteen calendar weeks of the semester. For this summer session, we will be using the full nine weeks of the summer to cover the material. Hopefully, you will find the pace to be just right – especially if you are working, traveling, or taking another course or two.

The course uses the textbook: Hinrichs & Wade. 2024. Energy: Its Use and the Environment. 6/e, Cengage Press. Readings associated with each topic are provided on pp. 4-5 of this syllabus. In addition, I will periodically provide access to outside readings that will be accessible online or emailed to you.

The primary goal is to have you view all of the lectures and read the readings - and to learn from them. To facilitate that goal, I provide study guides that you must complete as you progress through each lecture. Those study guides are available on the course website. To verify that you are keeping up with the material, I will ask you to email me your completed study guides in either a .docx or .pdf format by 11:59 PM the Monday of the following week (see course schedule on pp. 4-5. I will review each completed study guide for completeness and accuracy, and then email the graded guide back to you. In most cases, each guide will be worth ten points – or more if an outside reading is assigned. Penalty points will be deducted from study guides submitted after the deadline. Note that the graded guides are collectively worth 300 out of the 500 points, so they are important.

EGY 105 also contains two exams that will provide more comprehensive assessment of your understanding of the material. The exams will consist of a variety of questions (multiple choice, matching, short answer, essay, problems). Exams will be based largely on the lectures so **TAKE GOOD NOTES**. Collectively, the exams will count for 200 points. Each exam will be emailed to you as noted on this syllabus, and you will email your completed exam back to me by the requested date and time.

As lectures are made available, students are welcome to move through the material more quickly than the suggested pace. However, please note that some of the lectures are being updated throughout the summer. So don't get too far ahead! Conversely, students who lag behind run the risk of not being able to complete the study guides and exams in a timely and successful fashion.

Despite the online, on-demand format of course delivery, you are encouraged to ask questions and participate in class discussions through the Google Group that has been set up. If there is demand, I will set up periodic Zoom meetings so you can meet each other and discuss course material. I will also schedule a mandatory meeting with each of you via Zoom. Note that because of the weekly assignments, we will be very interactive. In short, I want you to learn the material and gain energy literacy – and will do what I can to help you achieve that goal.

Please refer all additional questions about class format and delivery to me.

Academic Honesty:

My ultimate goal in this course is for you to learn the material. In order for you accomplish that, you must honestly review the lectures and readings and complete the corresponding assignments and exams. Since we are doing this course remotely, I acknowledge that it is very easy to not do the work and submit somebody else's work (either from this semester or one previous) as your own. That is academically dishonest and short-circuits the learning process. Please don't do that!!

More generally, Academic Honesty requires students to refrain from cheating and to provide clear citations for assertions of fact, as well as for the language, ideas, and interpretations found within the works of others. Failure to formally acknowledge the work of others, including Internet resources, written material, and any assistance with class assignments, constitutes Plagiarism. Moreover, use of Artificial Intelligence – such as ChatGPT – to answer questions on your study guides or exams also constitutes plagiarism. Cheating and plagiarism are serious academic offenses that cannot be tolerated in a community of scholars. Violations of academic honesty will be addressed at the programmatic and university levels and may result in a decision of course failure or program dismissal (see Wilkes University Student Handbook).

Please contact me with any questions on Academic Honesty.

University Statement on Intellectual Responsibility and Plagiarism

At Wilkes the faculty and the entire University community share a deep commitment to academic honesty and integrity. The following are considered to be serious violations and will not be tolerated:

1. Plagiarism: the use of another's ideas, programs, or words without proper acknowledgment
2. Collusion: improper collaboration with another in preparing assignments, computer programs, or in taking examinations.
3. Cheating: giving improper aid to another, or receiving such aid from another, or from some other source.