



Energy Choices for the 21st Century

ENV 3368/5368 Course Syllabus

Instructor: Tim Edgar	Credit Hours: 3
Office: GC 4842	Semester: Fall 2024
Office Hours: Tuesday, Wednesday & Thursday 9:00 AM – 10:00 AM, and by appointment	Pre-requisites: None; a basic knowledge of algebra is needed for success in this course; calculus is not required.
Email: tim.edgar@ess.utah.edu	Meeting Times/Days: Online course, asynchronous (no scheduled meetings)

Non-Contract Note: The syllabus is not a binding legal contract, is meant to serve as an outline and guide for our course. It may be modified by the instructor when the student is given reasonable notice of the modification, particularly when the modification is done to rectify an error that would confuse and/or disadvantage the student. Any changes will be posted on Canvas.

Course Description

Course Summary

This class provides an introduction to critical energy issues facing our planet, with a focus on controversial topics, and some issues in Utah. These may include: hydraulic fracturing (fracking), offshore oil and gas development, oil shale and tar sand development, nuclear energy, renewable energy technologies such as wind and geothermal, the smart grid, difficulties in commercializing new energy technologies, air pollution, transportation choices, energy policy development, and global issues including population dynamics, climate change, carbon management, water resources, the Law of Unintended Consequences, and tipping points.

This course fulfills the Gen Ed requirements for **Sustainability (SUST)**.

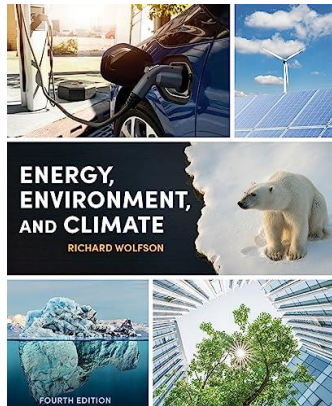
Student Learning Objectives and Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Apply a working knowledge of energy and power: what are they, units of energy and power and how to convert from one form to another. Different forms of energy (mechanical, chemical, heat, etc.), and the First and Second Law of Thermodynamics. Differentiate the energy use sectors (e.g., transportation vs. electricity production vs. residential heating and cooling) and how different energy resources are better suited for different purposes.
2. Compare and evaluate energy resources (fossil fuels, nuclear, renewables – wind, solar, geothermal and hydro), how much energy each can realistically provide and identify the advantages and disadvantages of each resource. Apply the principle of "unintended consequences" and the fact that there are always unintended and unanticipated consequences that may overwhelm the intended consequence. Students will discover that there are no "good" or "bad" energy resources and that a sustainable future will require diversified energy production with proper environmental regulations.
3. Evaluate the global distribution of energy resources and be able to critique and analyze energy policy, how and why it's made, and how we can develop energy policies that will sustain us and our children through the next century. Students will analyze how scientific facts and controversies are presented in the public forum, and how to interpret and judge critically important issues like hydraulic fracturing, carbon management, wilderness preservation, renewable energy, and global climate change.
4. Solve everyday issues in their lives with practical knowledge about things like conservation, selecting an automobile, knowing what an energy efficient home is and how to make a home more energy-efficient through design, insulation and other methods.
5. Collaborate with other students through the online experience to enhance learning through teamwork, leadership and group discussion, and will demonstrate their knowledge through homework, exams, and particularly in the online discussion groups where collaboration will be encouraged: Communicate; assist each other; organize a response.
6. Integrate all of the above into a functional knowledge and appreciation of energy, why we need it and how we can pursue it in a way that considers all the facets of sustainability: the ecological footprint, a skyrocketing global population, what sustainability really means and how we can change to achieve it in a context that will help the student chart a life-path that will incorporate the principles of sustainability.

Student will acquire skills and knowledge that they can use in their everyday lives. They will be able to read and interpret energy news in the context of a global community where energy demand may soon exceed some supplies. They will also be able to realistically evaluate energy resources and plan conservation measures and lifestyle changes that can help create a sustainable future. They will gain immediately applicable skills like knowing how to calculate the R-value of insulation, create a more energy-efficient home, select an automobile and reduce air pollution.

Required Materials



The textbook for the class is *Energy, Environment, and Climate*, 4th Edition, by Richard Wolfson. (ISBN-13: 978-0393893533)



Students will need access to an *electricity usage monitor*. The instructor has secured funding to purchase 10 monitors. A time will be arranged to checkout and return a monitor from the instructor at their office. Students will have a one-week period over which to collect data used in the course assignments. Students who return the monitor later than the 7-day checkout period will receive a 20% point reduction on Assignment 1. Students who do not return the energy monitor will receive and Incomplete (I) in the course.

Course Organization

This course is taught as an online class, with the textbook providing the primary structure of the course. Content is organized into four learning modules; each module is comprised of 3 to 5 chapters from the textbook.

Chapter Exercises

Each module contains Chapter Exercises that form the core of the work in this course and provide practice for the end of module exam. Think of the Chapter Exercises as homework or practice sets. The Chapter Exercises are comprised of multiple-choice questions and calculations that relate to the content of each chapter. There will be one or more Chapter Exercises for each chapter, feedback will be provided so you will be able to use the Chapter Exercises to prepare for each Module Exam. Chapter Exercises can be attempted an unlimited amount of times while the module is open, providing ample opportunity to earn full points on every Chapter Exercise.

The math in the Chapter Exercises is primarily applied to unit conversion. Examples include calculating the CO₂ emitted by combusting a given quantity of coal, or estimating the energy production of a wind turbine given a wind speed and a duration of time. The

methodology used in most of these calculations is *dimensional analysis* (a method of unit conversion). The material in the course also makes use of metric prefixes (kilo, mega, giga, etc.), and conversion between prefixes. The instructor is available for, and encourages, face-to-face meetings with students for assistance with calculations in this course. Either in-person on campus in Gardner Commons, or over Zoom.

Module Discussions

Each module contains a written, online Discussion, where you will interact with other students to discuss and address questions and current events related to that subject matter. The instructor will audit and help guide the discussion, pose questions and make comments as appropriate. You will be required to participate in your discussion group and will be graded on the quality of your contributions.

Independent and creative thinking is a primary criterion in scoring the online discussions. Accuracy, depth and quality of research are the second most important criteria, and grammar, organization and presentation are third.

Assignments

There are two Assignments in this course. They require the collection of data on personal energy consumption. Components Assignment 1 are distributed over Modules 2 and 3. Assignment 2 is contained in Module 4. Further details on each assignment will be provided on Canvas.

Module Exams

Each module concludes with an exam; there are a total of four (4) exams. There are no cumulative exams in this course. Each exam is fairly compartmentalized to cover just the content of the associated module. That said, the principles of unit conversion/dimensional analysis and prefix conversion learned in the first module extend throughout the course. All Module Exam questions will be covered in the reading, discussion, and exercise materials; a review sheet will be provided prior to each exam. A typical exam will contain several multiple-choice, fill-in-the-blank, and true/false question groups, have two to three problems to solve (similar in structure to the Chapter Exercises), and one or two short response questions. Expect calculations on each Module Exam. This course does not have a midterm or final exam. Exams are accessible between 6:00 AM to 11:59 PM on the dates listed in Outline of Course Schedule below, and on Canvas. You will have 2-hours to complete each exam. If an exam is started at 10:00 PM or later, it will still close at 11:59 PM, allowing for less than 2-hours to complete the exam.

Extra credit is **NOT** available in this course; students already have sufficient opportunities for learning and for demonstrating their knowledge of the subject and their effort and commitment in the class.

Students taking the course at the 5000 level will be held to a higher standard of performance, will be expected to take a leadership role in student discussions, will have additional and/or more difficult questions on exams and assignments, and may be asked to assist in mentoring other students.

Evaluation & Grading

Components of the course grade are as follows.

Chapter Exercises	10%
Online Discussions	10%
Assignment 1	20%
Assignment 2	20%
Module Exam 1, 2, 3, and 4	10% Each (40% Total)

Grading Scheme

A 100%-93%	A- <93%-90%	
B+ <90%-87%	B <87%-83%	B- <83%-80%
C+ <80% - 77%	C <77%-73%	C- <73%-70%
D+ <70%-67%	D <67%-63%	D- <63%-60%
E 59.9%-0%		

Outline of Course Schedule

Module 1: 19 August – 16 September

Readings and Chapter Exercises for Chapters 1-4

Discussion 1: **Due Friday, 6 September**

Module Exam 1: **Monday, 16 September**

Module 2: 17 September – 4 October

Readings and Chapter Exercises for Chapters 5-7

Discussion 2: **Due Wednesday, 2 October**

Module Exam 2: **Thursday, 3 October**

Data Collection for Assignment 1: Submit to Canvas by **Friday, 4 October**

Module 3: 14 October – 10 November

Readings and Chapter Exercises for Chapters 8-11

Discussion 3: **Due Friday, 1 November**

Module Exam 3: **Friday, 8 November**

Assignment 1: Submit to Canvas by **Sunday, 10 November**

Module 4: 11 November – 5 December

Reading and Chapter Exercises for Chapters 12-16

Assignment 2: Submit to Canvas by **Tuesday, 26 December**

Discussion 4: Due **Tuesday, 3 December**

Module Exam 4: **Thursday, 5 December**

Online Course Expectations

Instructor Expectations

Your instructor is committed to the following expectations for this course:

- The instructor will design the course to include readings materials, discussions, and assignments that will challenge students and will provide them with opportunities to learn and practice course content.
- Though this is online course, it is not a class that is run “automatically” by technology. The instructor will interact with the class via announcements, emails, feedback on assignments, and face-to-face meeting in-person or over Zoom, among other methods.
- The instructor will score and provide feedback on the assignments and discussions in a timely manner.

Student Expectations

The following is expected of all students in this class:

- Students will log in to the course a minimum of 3 times per week.
- Communication is very important. Let the instructor know when you need help.
- To do well in online courses, students must be self-motivated, organized, and willing to stay on top of their schedule. Students should take control of their learning while in this course.
- Students will engage with the course, students, and the instructor in a respectful and professional manner at all times.

Key to Success in this Class:

Students are responsible for acquainting themselves with, and satisfying, the entire range of academic objectives and requirements as defined by the instructor.

Your best strategy for success is to complete all the readings, make sure you understand content of the Chapter Exercises (ask questions if you don't!), and to participate actively in the group discussions! All Modular Assessment questions will have been covered in the readings, chapter exercises, and class discussions. The instructor is available to provide individual assistance to students by meeting in-person on campus and/or over Zoom.

Netiquette

Students are expected to follow the [Core Rules of Netiquette](#) at all times while participating in the class, interacting with other students, and communicating with the course instructor.

Course Policies

Attendance & Participation

The University expects regular “attendance at all class meetings” – in our case, that means participation in all online activities in accordance with the class schedule. Except in the rare cases of sudden illness or emergency (excused with documentation), students are expected to arrange with the instructors to submit assignments in advance of a planned absence.

Canvas

This course uses Canvas as the meeting and learning environment.

Problems with Canvas? Search for resources or contact [Canvas Support](#) by clicking the Help button located on the left-side menu in Canvas.

Communication

If you have questions related to the course, please email me at tim.edgar@ess.utah.edu, or send a message through the Canvas email tool. I will respond in a timely manner.

Late Assignments

Late assignment policy applies to Discussions and the components of the two Assignments.

- Up to 6 hours late: no penalty
- 1 day late: 10% deduction
- 2-4 days late: 30% deduction
- 5-7 days late: 50% deduction
- Over a week late: 70% deduction

Institutional Policies, Procedures, & Resources

1. ***Sustainability Course Attribute.*** Course content must explore four UN Sustainable Development Goals (SDGs) and/or Sustainability Topic Areas (STAs) to fulfill the University of Utah requirements for the Sustainability (SUST) course attribute.

Content in this course explores:

- SDG 07: [Ensure access to affordable, reliable, sustainable and modern energy for all](#)
- SDG 11: [Make cities and human settlements inclusive, safe, resilient and sustainable](#)
- SDG 13: [Take urgent action to combat climate change and its impacts](#)
- STA 01: Greenhouse Gases & Human Modification
- STA 02: Air Quality

Student Learning Objectives and Learning Outcomes 2, comparison and evaluation of energy resources, including unintended and unanticipated consequences, align with SDG 7 and STA 1. Students will discover that there are no “good” or “bad” energy resources. All energy resources used by humans have provided benefits, and all have environmental, societal, and/or economic impacts. A sustainable future will require diversified energy production with proper environmental regulations.

Student Learning Objectives and Learning Outcomes 3, and the last module in this course, focuses on the global impact of fossil fuel combustion, and is strongly connected to SDG 13 and STA 2. Module 4 takes students through an understanding of Earth’s energy balance, why climate changes, how and why Earth’s climate is changing, projections of future climate, and how the link between energy and climate can be broken.

2. ***The Americans with Disabilities Act.*** The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. , Reasonable prior notice needs to be given to the [Center for Disability & Access](#) (CDA), Student Services Building, Basement Level, Room 65, (801) 581-5020, if you require accommodations in this course. CDA will work with you and the instructor

to arrange for accommodations. All written information in this course can be made available in an alternative format with prior notification to the CDA.

a. [Accommodation Policy \(see Section Q\)](#):

3. **Addressing Sexual Misconduct.** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the [Office of Equal Opportunity, Affirmative Action, and Title IX](#), 801-581-8365, or the [Office of the Dean of Students](#), 801-581-7066. For support and confidential consultation, contact the [Center for Campus Wellness](#), 801-581-7776. To report to the [University Police](#), call 801-585-2677.
4. **Drop/Withdrawal.** Students may drop a course by Friday, 30 August without any penalties. Students may officially withdraw (W) from a class by Friday, 18 October. A "W" grade is recorded on the transcript and appropriate tuition/fees are assessed. The grade "W" is not used in calculating the student's GPA. See the [Academic Calendar](#) for additional semester deadlines.
5. **Academic Misconduct/Plagiarism/Cheating.** It is assumed that all work submitted to your instructor is your own work. When you have used ideas of others, you must properly indicate that you have done so. Plagiarism and cheating are serious offenses and may be penalized by failure on an individual assignment, and/or failure in the course. Academic misconduct, according to the University of Utah Student Code, "includes, but is not limited to, cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information...It also includes facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct." For detailed definitions and possible sanctions please see the [Student Code](#).
6. **Wellness Statement.** Your personal health and wellness are essential to your success as a student. Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive in this course and at the University of Utah. Please speak with the instructor before issues become problems. And, for helpful resources, contact the [Center for Campus Wellness](#), 801-581-7776.
7. **Veterans Support.** The [Veterans Support Center](#) is a "one stop shop" for student veterans to find services, support, advocacy, and camaraderie. They are located in the Union Building Room 418, 801-587-7722.
8. **LGBT Resources.** To comply with [HB 261](#), student resources and support programs previously managed by the LGBT Resource Center will now be administered by the [Center for Student Access & Resources](#).
9. **Learners of English as an Additional/Second Language.** If you are an English language learner, please be aware of several resources on campus that will support

you with your language and writing development. These resources include: the [University Writing Center](#) and the [English Language Institute](#).

- 10. *Safety and Wellness.*** Your safety is our top priority. In an emergency, dial 911. Report any crimes or suspicious people to 801-585-COPS (801-585-2677); this number will get you to a dispatch officer at the University of Utah Department of Public Safety (DPS). If at any time, you would like to be escorted by a security officer to or from areas on campus, DPS will help – just give a call. Visit [SAFEU](#) for more information regarding safety and to view available training resources. The University of Utah seeks to provide a safe and healthy experience for students, employees, and others who make use of campus facilities. In support of this goal, the University has established confidential resources and support services to assist students who may have been affected by harassment, abusive relationships, or sexual misconduct. A detailed listing of University Resources for campus safety can be found on the [Department of Public Safety](#) website. Your well-being is key to your personal safety. If you are in crisis, call [Community Crisis Intervention & Support Services](#) at 801-587-3000; help is close. The university has additional excellent resources to promote emotional and physical wellness, including the [Counseling Center](#) and [Center for Campus Wellness](#). Counselors and advocates in these centers can help guide you to other resources to address a range of challenges, including substance abuse and addiction.
- 11. *Undocumented Student Support.*** Immigration is a complex phenomenon with broad impact – those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. **Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence.** The [Dream Center](#) offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801-213-3697.
- 12.** Please let your instructor know if there is any additional support you would like to discuss for this course.