

AOM 2520
Global Sustainable Energy: Past, Present and Future

Fall 2023 Distance course (Canvas), one hour per week mandatory meeting via web, Period 9, Monday

Instructor: Dr. Dan Hofstetter, P.E.
Assistant Professor
Rogers Hall, Rm 263
Use email within Canvas
Office hours: Will be announced

Catalog Description

Students will be able to analyze energy consumption patterns for individuals and nations, and include all sectors of the global economy from fully developed countries to developing nations. New renewable energy sources will be investigated and international solutions to future needs will be analyzed. Both physical limitations and capabilities of these new sources will be presented and debated.

Pre-requisites/Co-requisites:

None

Course Objectives

This general education course will cover concepts of work and energy and their relationship with our modern society. Each aspect of this relationship with energy will be analyzed including consumptive patterns for the residential, commercial, and transportation sectors of our economy. Energy capacities and limitations for new sources of renewable energies will also be examined. All of these topics will be examined within a national and international context. A comparison between other countries and peoples will be an integral part of this course. Detailed course objectives are:

- Students will be able to describe historical sources of energy, including human, animal, water, wind, and biomass.
- Students will work with concepts of work and energy and their relationship to human development.
- Students will be able to evaluate national and international energy consumption patterns related to economic sectors such as transportation, residential commercial and agricultural.
- US energy consumption patterns will be compared to other countries' consumption.
- A student completing this course will be able to evaluate the role that energy efficiency can play in transforming consumptive patterns.
- Students completing this course will be able to construct a viable ten-year energy plan that will transform electricity production from predominantly fossil fuel based to renewable energy sources.
- Students completing this course will be able to construct a viable ten-year energy plan that will transform the US transportation system to a significantly more efficient and more renewable system.

Course Outline

1. Week 1/Mod 0: During drop/add students will work through tutorials designed to explain all of the new online tools and methods that are required for successful completion of this class.
2. Week 2/Mod 1: The basics of energy will be explored. Terms and units will be explained. The amount of energy people use each day, from a past and present perspective will be evaluated from both U.S. and global perspectives and the cultural and geographic factors leading to differences will be considered. Simple calculations will allow for a common comparison among various forms of energy.
3. Week 3/Mod 2: History of agriculture and food systems will be examined. The role of mechanization and energy use and its effect on crop yields will be analyzed. Energy consumption for food systems will be presented.
4. Week 4/Mod 3: Transportation energy consumption will be analyzed. Major modes such as automobile, railroad and airplanes will be described. New technologies and their ability to transform this sector will be presented and debated.
5. Week 5/Mod 4: Energy in the built environment. The energy consumption related to residential and commercial spaces will be analyzed. Particular emphasis will be given to areas undergoing rapid change such as lighting, phantom loads, water heating, etc.
6. Week 6/Mod 5: Heat engines will be compared to direct conversion devices and what that means for the future.
7. Week 7/Mod 6: Renewable energy technologies will be presented along with appropriate capacity factors, growth rates, costs and cost trends
8. Week 8/Mod 7: Energy storage technologies will be presented along with appropriate capacity factors, growth rates, costs and cost trends.
9. Week 9/Mod 8: System efficiencies and disruptive technologies. The fallacy of Jevon's Paradox will be explained along with the ideas of tipping points and disruptive technologies like LED lights, electric cars and solar energy.
10. Week 10/Mod 9: Renewable energy and energy efficiency at the global scale. The current status of these technologies will be presented along with explanations of probable trends. Fallacies of linear projections will be discussed.
11. Weeks 11 and 12/Mod 10: Students will use knowledge gained in this class to produce a ten-year road map designed to transform our electrical power system from fossil fueled to renewable energy. Students will use participatory blogs to critique and support various scenarios.
12. Weeks 13 and 14/Mod 11: Students will use knowledge gained in this class to produce a ten-year road map designed to transform our liquid fuel transportation system from fossil fueled to renewable energy. Students will use participatory blogs and other online techniques to critique and support various scenarios.
13. Week 15: Class summary.

There will be many new online tools that will help us manage the class and related coursework. We have a one hour Zoom session during **9th period every Monday** (except the first week and holidays). Zoom is a required online discussion tool that will allow us to communicate as a class, exchange ideas in real time and answer questions.

Discussion boards will be assigned every week (unless otherwise noted). Discussion Boards require an original post due Thursday night by 11:59pm (unless otherwise noted) and two responses to other posts by Sunday night by 11:59pm (also, unless otherwise noted). These responses should be approximately one paragraph in length. Responses such as: "I agree" or "Great!" are not

acceptable. These are professional responses so remember to use polite, professional language, cite your sources and only post during the times allotted for each discussion.

Any difficulties with Zoom tools or procedures should be worked through the UF Helpdesk first. Do not wait until the last moment to log onto your Zoom session. There are typically no make-up sessions for the Zoom. There is a complete online training site for this with extensive helpdesk features. Time does not permit everything to be covered in the lectures therefore, reading and homework will be assigned. Every effort will be made to answer your emails within 24 hours during the normal work week.

Texts: There are no required texts for this class. Numerous selected readings are included as links or attached texts.

Grading

Current Events:	14 x 5 pts each	70 pts
Zoom:	14 x 5 pts	70 pts
Quizzes:	13 x 10 pts each	130 pts
Discussion:	8 x 10 pts each	80 pts
Residential Project:	40 points	40 pts
Transportation Survey	20 pts	20 pts
Transformation Projects:	3 x 20 pts each	60 pts
Total points		470 pts

Each discussion group requires one original post by Thursday at (11:59) midnight with two additional posts due by Sunday (11:59) midnight. An acceptable original post is worth 6 points and the two responses are worth the remaining four points combined. Any exceptions will be noted. Grading criteria for the discussion groups will be included in the assignment description.

Projects are worth 15 to 40 points each and grading instructions are included in the information provided for that week.

470-441 pts	=	A
440-423	=	A-
422-409	=	B+
408-385	=	B
384-376	=	B-
375-362	=	C+
361-338	=	C
337-329	=	C-
328-315	=	D+
314-291	=	D
290-282	=	D-
<281	=	E

Projects and homework will be due on or before the date assigned in class. Late work will not be accepted without prior approval. A penalty of 10% per class period will be assessed for late assignments without approval. **Class participation is expected.**

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

General Requirements

1. Many assignments, whether homework or group projects, will be due on a given date. Late assignments will lose points in grade for each day late. Missed exams may be rescheduled only with proper documented excuses within **one week** of the original date given.
2. There is no cumulative final exam.

Attendance and Make-Up Work

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>.

Online Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at

<https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Online Courses

Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See <https://pfs.tnt.aa.ufl.edu/state-authorization-status/#student-complaint> for more details.

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

Software Use:

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

0001 Reid Hall, 352-392-8565, <https://disability.ufl.edu/>

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Wellness Coaching
- U Matter We Care, www.umatter.ufl.edu/
- *Career Connections Center, First Floor JWRU, 392-1601, <http://career.ufl.edu/>*
- Student Success Initiative, <http://studentsuccess.ufl.edu>.

Student Complaints:

- Residential Course: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>.
- Online Course: <https://pfs.tnt.aa.ufl.edu/state-authorization-status/#student-complaint>