IDS 2935: The Future of Energy
Quest 2

I. General Information

Class Meetings

- Fall 2024
- Tuesdays 09:35-10:25 **(MCCB G086, ground floor)**, Thursdays 09:35-11:30 **(FLG 270)**
  Please note the different classrooms!

Instructor

- Dr. Johanna Engström
- Office: Turlington Hall 3206
- Office hours: Tuesdays 10:30-11:30, Thursdays 1-3 pm
- Email: joem@ufl.edu

Teaching Assistant

- Natalia Dambe
- Email: ndambe@ufl.edu

Course Description

The Future of Energy takes the students on a journey through the history of energy use, issues associated with different technologies, and future challenges and opportunities. The course brings up pressing questions such as *Is Renewable Energy Always Sustainable? Are Renewable Energies Always a Better Option for the Environment?* and *What does a future sustainable energy situation look like?* and challenges the students to find the answers to these questions via a combination of readings, lectures, discussions and reflection. The course also explores geographic differences between different states, countries and societies, which contributes to shaping the energy landscape now and in the future.

Class meetings are a combination of lecturing, discussion and assignments. Student class performance is evaluated using a range of different assessments, recognizing each student's individual learning style.

Quest and General Education Credit

- Quest 2
- Physical Sciences (P)
- International (N)

This course accomplishes the Quest and General Education objectives of the subject areas listed above. A minimum grade of C is required for Quest and General Education credit. Courses intended to satisfy Quest and General Education requirements cannot be taken S-U.

Required Readings and Works

All readings and works are available in Canvas.
Materials and Supplies Fees: n/a

II. Graded Work

Description of Graded Work

Exam 1: 15%
Exam 2: 15%
Exam 3: 15%
Essays: 20%
Exercises: 15%
In-class debates: 10%
Attendance: 10%

Exams
The three exams are completed during the normal class meeting time and constitute 45% of the final grade. The exams are made up of a combination of multiple choice and short answer questions. If students for whatever reason miss an exam, they get the opportunity to make-up the exam on December 3rd, 2024.

Essays
Students will complete four essays in this class, three short essays (400-500 words) and one longer (1000-1200 words) essay. These four essays are discussions, reviews, or summaries of data, but also contains a reflective aspect where students are expected to put the facts at hand into a larger perspective. The students will be informed in class/Canvas what type of essay is expected. The essays are completed as homework and submitted via Canvas.

Exercises
Students will complete three hands-on exercises, each worth 5%. Exercise 1 is related to energy units and is aimed to help conceptualize how much energy you get from common units, such a Joule, Watt, etc. as well as how much you use. Exercise 2 and 3 are mapping exercises where the class will create a global map of energy installations.

In-class debates
There will be two debates during the semester. Students will be required to participate in one of the debates, and will be assigned a position and prepare themselves with relevant readings. The classroom will be set up as a court and students will need to argue for their stance, while also recognizing the opposing side's interests and meet those arguments.

Attendance
Students are expected to regularly attend class and to actively engage in the lectures and classroom activities. Attendance will be taken using spot attendance calling at 10 selected class meetings throughout the semester, including the guest lecture and at the field trip.

Late submissions
All submissions are due on Sundays at 11:59 PM the week of the assignment, unless specified differently. Course work submitted late without valid reason (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) will receive a grade penalty of -10% per day.

Grading Scale

For information on how UF assigns grade points, visit: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

A	94 – 100%		C	74 – 76%
A-	90 – 93%		C-	70 – 73%
B+	87 – 89%		D+	67 – 69%
B	84 – 86%		D	64 – 66%
B-	80 – 83%		D-	60 – 63%
C+	77 – 79%		E	<60

Grading Rubrics

Essay Rubric

Criteria	Target (1 pts)	Near Target (0.5 pts)	Below Target (0 pts)
1. Purpose and scope	Addresses key concepts appropriate for the purpose and scope. Information is accurate and sufficiently supported by appropriate evidence.	Does not fully address key concepts or is missing a key concept appropriate for the purpose and scope. Some information is missing, and/or not adequately supported by appropriate evidence.	Does not adequately address key concepts appropriate for the purpose and scope. Frequently information is missing and/or not adequately supported by appropriate evidence.
2. Organization	Fully supports the essay and purpose. Sequence of ideas is effective. Transitions are smooth and effective.	Organization supports essay and purpose. Transitions are generally appropriate. However, sequence of ideas could be improved.	Unclear and/or inappropriate organizational plan.
3. Critical Thinking	Conclusions are logical and address all important ideas. Evidence provides rationale for the conclusion, covers multiple viewpoints, and includes an adequate evaluation of context, perspectives of self and sources, and limitations.	Conclusions are logical and address the most important ideas. Lacks incorporation of a key perspective or adequate evaluation thereof.	Conclusions may be logical but not necessarily focused on primary ideas. Lacks incorporation of some key perspectives or adequate evaluation thereof.
4. Sources	Uses sources to support, extend, and inform, but not substitute for writer's own development of ideas. Skillfully combines material from a variety of sources. Always conforms to style manual.	Uses sources to support, extend, and inform the writer's own development of ideas. Quotations and paraphrases may be too long and/or inconsistently referenced.	Fails to use sources and/or overuses quotations or paraphrasing and/or uses source material without acknowledgement.
5. Grammar, mechanics and presentation	Well-structured sentences. Virtually free from punctuation, capitalization and spelling errors. Within assignment word limit.	Effective and varied sentences; minor errors due to lack of careful proof reading. Contains several punctation, spelling and/or capitalization errors. Within assignment word limit.	Frequent errors in spelling, punctuation and capitalization hindering clear communication. Below/above assignment word limit.

Debate Rubric

	HIGH QUALITY	AVERAGE	NEEDS IMPROVEMENT
CONTENT (40%)	Presents facts from reputable sources, which also are cited/referred to.	Presents facts, sources unknown.	Fails to present facts.
ARGUMENT AND SUPPORT (40%)	Can use facts to support arguments for their stance.	Presents arguments, but direct link to facts is vague.	Limited arguments or no connection to facts presented.
PROFESSIONALISM (20%)	Presents facts and arguments and meet opposing arguments in a professional way.	Struggles to meet opposing arguments in a professional way.	Fails to keep involvement in the debate professional.

III. Annotated Weekly Schedule

Week	Topics, Homework, and Assignments
Week 1	• **Topic**: Syllabus and Introduction • **Summary:** An introduction to the course. • **Required Readings:** N/A • **Assignment:** N/A
Week 2	• **Topic**: History of energy use and Energy Profile of the United States • **Summary:** Energy doesn't always equal electricity. Humans have harnessed the power of nature for millennia. This week covers major milestones in humans' use and taming of energy from a global perspective. Where does the U.S. energy come from, and how does it vary geographically and over time? • **Required Readings:** Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) Chapter 1 (pages 1-23). *Available for free online via UF Libraries, (please note that you need to be logged in to you Gatorlink account or on campus to access the text).* • **Assignment:** Essay 1: Compare the U.S. Energy Profile with that of other countries (homework due Sunday, 11:59 pm).
Week 3	• **Topic**: What is sustainable energy? and How much energy? • **Summary**: BTUs, MWh, Joule… what do the units stand for and how much do you use? • **Required Readings: "**'Watts' the mystery? The energy units that power our lives" and "What is sustainability?" (pdf available in Canvas) • **Assignments**: Exercise 1: Calculate your energy use, and that of different states and countries. How many powerplants would be needed to cover that need? (in class) Essay 2: Discussion on a sustainable vs. a non-sustainable energy option for your home state/country (homework due Sunday, 11:59 pm).

Week	Topics, Homework, and Assignments
Week 4	*Catch-up, Review and Exam 1 September 12*
Week 5	• **Topic**: Renewable Energy around the World, Part 1: Power derived from water • **Summary**: Why do different countries have different energy mixes? Why are there no hydropower plants in Florida? Which countries have the most hydropower and why? • **Required Readings:** Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 184-204). *Available for free online via UF Libraries.* **Assignment:** Exercise 2: Class project: Make a global map of renewable energy projects (in class).
Week 6	• **Topic:** Renewable Energy around the World, Part 2: Wind power • **Summary**: Why do different countries have different energy mixes? Why are there no wind turbines in Florida? Which countries have the most wind power and why? • **Required Readings:** Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 159-179). *Available for free online via UF Libraries.* • **Assignment:** N/A
Week 7	• **Topic:** Renewable Energy around the World, Part 3: Solar power and Bioenergy • **Summary**: Why do different countries have different energy mixes? Why are there no solar panels in the Sahara Desert? . Where is it viable to use biomass as a source of energy, and how can it be done in a sustainable way? • **Required Readings:** Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 132-155 and 208-231). *Available for free online via UF Libraries.* • **Assignment**: N/A
Week 8	• **Topic**: New technologies • **Summary**: Case studies of up-and-coming energy technologies from around the world. • **Required Readings:** Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 340-347). *Available for free online via UF Libraries* • **Assignment**: Exercise 3: Class project: Make a global map of energy pilot projects (in class).
Week 9	*Catch-up, Review and Exam 2 October 17*
Week 10	• **Topic**: Are renewable energies always better for the environment? • **Summary**: Renewable energies are often being promoted as a more environmentally friendly option but can have detrimental impacts. This week environmental impacts of different power sources are compared and discussed. • **Required Readings:** Pick 2, one from Category A, and once from Category B: *Category A:* Panwar, N. L., Kaushik, S. C., & Kothari, S. (2011). Role of renewable energy sources in environmental protection: A review. *Renewable and sustainable energy reviews*, *15*(3), 1513-1524. Saidi, K., & Omri, A. (2020). The impact of renewable energy on carbon emissions and economic growth in 15 major renewable energy-consuming countries. *Environmental research*, *186*, 109567.

Week	Topics, Homework, and Assignments
	Category B: Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 180+224-231). *Available for free online via UF Libraries.* EPA (2020) The Sources and solutions: Fossil Fuels. • **Assignment**: In-class debate 1 (in class). Students not participating in the debate will write a 1000-1200 word essay on the topic (homework).
Week 11	• **Topic**: Future energy Part 1: Storage and Limiting Energy Use • **Summary**: With continued development and electrification of society, the demand for power is ever growing. At the same time some regions experience a discrepancy between where the power is generated vs. where it's needed. • **Required Readings:** Forbes (2020) What's next for Energy Storage Technology? • **Assignment**: Tentative: Attendance at guest lecture: Program for Resource Efficient Communities (PREC)/UF Office of Sustainability (in class).
Week 12	• **Topic**: Future Energy Part 2: Policy and Economics • **Summary**: Aspects of policy and economics that guide energy production, consumption and development. • **Required Readings:** Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 314-330). *Available for free online via UF Libraries* Gustafson, A., Goldberg, M. H., Kotcher, J. E., Rosenthal, S. A., Maibach, E. W., Ballew, M. T., & Leiserowitz, A. (2020). Republicans and Democrats differ in why they support renewable energy. *Energy Policy*, *141*, 111448 • **Assignment**: TBA
Week 13	• **Topic**: Bringing it all together: is it possible to cover the world's energy needs with renewable energies alone? • **Summary**: The physical as well as economic and political potential for sustainable renewable energies varies throughout the world. What are the threats and opportunities to a sustainable energy future? • **Required Readings:** Moriarty, P., & Honnery, D. (2016). Can renewable energy power the future?. *Energy policy*, *93*, 3-7. • Jacobson et al. (2022). Low-cost solutions to global warming, air pollution, and energy insecurity for 145 countries. *Energy & Environmental Science*, *15*(8), 3343-3359. • **Assignment**: In-class debate 2 (in class). Students not participating in the debate will write a 1000-1200 word essay on the topic (homework).
Week 14	*Review and Exam 3 (Nov 21)*
Week 15	**THANKSGIVING WEEK, NO CLASS MEETING**
Week 16	**MAKE UP EXAM** Dec 3rd 9:35 am

IV. Student Learning Outcomes (SLOs)

At the end of this course, students will be expected to have achieved the Quest and General Education learning outcomes as follows:

- **Content***: Students demonstrate competence in the terminology, concepts, theories and methodologies used within the discipline(s)*.
    - Describe the basic principles of sustainability in general and sustainable energy in particular (Quest 2, N) Assessment: Exams, essays.
    - Describe and explain how different types of energy production works, as well as their pros and cons (Quest 2, P) Assessment: Exams, essays.

- **Critical Thinking**: *Students carefully and logically analyze information from multiple perspectives and develop reasoned solutions to problems within the discipline(s).*
    - Identify, analyze and evaluate geographic differences in energy production and demand (Quest 2, N, P) Assessment: Exams, essays.
    - Analyze the concept of sustainable energy, is it permanent and the same in all geographic settings? (Quest 2, N) Assessment: Exams, essays.

- **Communication**: *Students communicate knowledge, ideas and reasoning clearly and effectively in written and oral forms appropriate to the discipline(s).*
    - Communicate orally and in writing on the opportunities and threats associated with renewable energy development (Quest 2, N, P) Assessment: In-class debate, essays
    - Communicate orally on the opportunities and threats to the development of a society powered by sustainable energies (Quest 2, N, P) Assessment: In-class debate

- **Connection**: *Students connect course content with meaningful critical reflection on their intellectual, personal, and professional development at UF and beyond.*
    - Reflect on how you as an individual and your community can contribute to a sustainable energy situation, considering not only the three pillars of sustainability, but also energy sources, demand, and policy (Quest 2) Assessment: In-class debate, essays.

V. Quest Learning Experiences

1. Details of Experiential Learning Component

In this course the students will visit and get a guided tour of a local solar power farm (exact location TBD). The aim is to do this visit during the usual class meeting time. After the visit students are required to complete a brief report on the field trip, which will count towards the *Essay*-part of the grade. Students who can present documentation supporting a valid excuse for not attending will get the opportunity to watch a video recording of the visit and base their report on that.

2. Details of Self-Reflection Component

The course promotes self-reflection through

1. Reflective essays. The assigned *Essays* vary in nature, from pure reports/summaries to discussions and reflections, challenging the students to put the topic at hand into a larger perspective, while also making the connection to their own life and experiences.
2. In-class debates where students need to pick a position and develop arguments for their stance.

VI. Required Policies

Attendance Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Students Requiring Accommodation

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

UF Evaluations 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/.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Counseling and Wellness Center

Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx , 352-392-1575; and the University Police Department: 352-392-1111 or 9-1-1 for emergencies.

The Writing Studio

The writing studio is committed to helping University of Florida students meet their academic and professional goals by becoming better writers. Visit the writing studio online at http://writing.ufl.edu/writing-studio/ or in 2215 Turlington Hall for one-on-one consultations and workshops.

In-Class Recordings

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.