

# IDS 2935: The Future of Energy

## Quest 2

### I. General Information

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#### Class Meetings

- Fall 2022
- Tuesdays 09:35-10:25 (**MAT0117**), Thursdays 09:35-11:30 (**MAT0004**)  
*Please note the different classrooms!*

#### Instructor

- Dr. Johanna Engström
- Office: Turlington Hall 3206
- Office hours: Tuesdays 10:30-11:30, Thursdays 2-4 pm
- Email: [joem@ufl.edu](mailto:joem@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 and discussion of readings. 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

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### 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 constitutes 50% of the final grade. The exams are made up of a combination of multiple choice and short answer questions.

#### Essays

Students will complete five essays in this class, four short essays (400-500 words) and one longer hypothesis driven (1000-1200 words) essay. These five 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 (week 10 and 15). 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. Students not being assigned to participating in the debate will write an essay on the topic.

#### 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.

## 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

	SATISFACTORY (Y)	UNSATISFACTORY (N)
<b>CONTENT</b>	Papers exhibit evidence of ideas that respond to the topic with complexity, critically evaluating and synthesizing sources, and provide at least an adequate discussion with basic understanding of sources.	Papers either include a central idea(s) that is unclear or off-topic or provide only minimal or inadequate discussion of ideas. Papers may also lack sufficient or appropriate sources.
<b>ORGANIZATION AND COHERENCE</b>	Documents and paragraphs exhibit at least some identifiable structure for topics, including a clear thesis statement but may require readers to work to follow progression of ideas.	Documents and paragraphs lack clearly identifiable organization, may lack any coherent sense of logic in associating and organizing ideas, and may also lack transitions and coherence to guide the reader.
<b>ARGUMENT AND SUPPORT</b>	Documents use persuasive and confident presentation of ideas, strongly supported with evidence. At the weak end of the Satisfactory range, documents may provide only generalized discussion of ideas or may provide adequate discussion but rely on weak support for arguments.	Documents make only weak generalizations, providing little or no support, as in summaries or narratives that fail to provide critical analysis.
<b>STYLE AND MECHANICS</b>	Documents use a writing style with word choice appropriate to the context, genre, and discipline. Papers will feature correct or error-free presentation of ideas. At the weak end of the Satisfactory range, papers may contain some spelling, punctuation, or grammatical errors that remain unobtrusive so they do not muddy the paper's argument or points.	Documents rely on word usage that is inappropriate for the context, genre, or discipline. Sentences may be overly long or short with awkward construction and poor grammar. Documents may also use words incorrectly.

## 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	<ul style="list-style-type: none"> <li>• <b>Topic:</b> What is sustainable energy?</li> <li>• <b>Summary:</b> Define sustainability. Is renewable energy always sustainable? Is sustainability permanent?</li> <li>• <b>Required Readings:</b> National Geographic: Future Power: Where Will the World Get Its Next Energy Fix?</li> <li>• <b>Assignment:</b> Essay 1: Discussion on a sustainable vs. a non-sustainable energy option for your home state/country (homework).</li> </ul>
Week 2	<ul style="list-style-type: none"> <li>• <b>Topic:</b> History of energy production and use</li> <li>• <b>Summary:</b> 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.</li> <li>• <b>Required Readings:</b> Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) Chapter 1 (pages 1-8). <i>Available for free online via UF Libraries.</i></li> <li>• <b>Assignment:</b> N/A</li> </ul>
Week 3	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Energy Profile of the United States</li> <li>• <b>Summary:</b> Where does the U.S. energy come from, and how does it vary geographically and over time?</li> <li>• <b>Required Readings:</b> Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) Chapter 1 (pages 9-23). <i>Available for free online via UF Libraries</i></li> <li>• <b>Assignment:</b> Essay 2: Compare the U.S. Energy Profile with that of other countries (homework).</li> </ul>
Week 4	<ul style="list-style-type: none"> <li>• <b>Topic:</b> How much energy?</li> <li>• <b>Summary:</b> BTUs, MWh, Joule... what do the units stand for and how much do you use?</li> </ul>

Week	Topics, Homework, and Assignments
	<ul style="list-style-type: none"> <li>• <b>Required Readings:</b> EIA (2020) Measuring Electricity</li> <li>• <b>Assignment:</b> 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)</li> </ul>
Week 5	<i>Review and Exam 1</i>
Week 6	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Renewable Energy around the World, Part 1: Power derived from water</li> <li>• <b>Summary:</b> Why do different countries have different energy mixes? Why are there no hydropower plants in Florida? Which countries have the most hydropower and why?</li> <li>• <b>Required Readings:</b> Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 184-204). <i>Available for free online via UF Libraries.</i></li> <li>• <b>Assignment:</b> N/A</li> </ul>
Week 7	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Renewable Energy around the World, Part 2: Wind power</li> <li>• <b>Summary:</b> 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?</li> <li>• <b>Required Readings:</b> Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 159-179). <i>Available for free online via UF Libraries.</i></li> <li>• <b>Assignment:</b> N/A</li> </ul>
Week 8	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Renewable Energy around the World, Part 3: Solar power</li> <li>• <b>Summary:</b> Why do different countries have different energy mixes? Why are there no solar panels in the Sahara Desert?</li> <li>• <b>Required Readings:</b> Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 132-155). <i>Available for free online via UF Libraries.</i></li> <li>• <b>Assignment:</b> Field trip: Visit to local solar farm (<i>Experimental Learning Activity</i>) Essay 3: Report on field trip (the field trip takes place during the normal class meeting time, the essay is completed afterwards, as homework)</li> </ul>
Week 9	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Renewable Energy around the World, Part 4: Bioenergy</li> <li>• <b>Summary:</b> One of the oldest sources of energy is gaining popularity again. Where is it viable to use biomass as a source of energy, and how can it be done in a sustainable way?</li> <li>• <b>Required Readings:</b> Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 208-231). <i>Available for free online via UF Libraries.</i></li> <li>• <b>Assignment:</b> Exercise 2: Class project: Create a map of significant global renewable energy installations (max 2 per country), drawing from examples covered in week 6-8 (homework).</li> </ul>
Week 10	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Are renewable energies always better for the environment?</li> <li>• <b>Summary:</b> 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.</li> <li>• <b>Required Readings:</b> Pick 2, one from Category A, and once from Category B: <i>Category A:</i></li> </ul>

Week	Topics, Homework, and Assignments
	<p>Panwar, N. L., Kaushik, S. C., &amp; Kothari, S. (2011). Role of renewable energy sources in environmental protection: A review. <i>Renewable and sustainable energy reviews</i>, 15(3), 1513-1524.</p> <p>Saidi, K., &amp; Omri, A. (2020). The impact of renewable energy on carbon emissions and economic growth in 15 major renewable energy-consuming countries. <i>Environmental research</i>, 186, 109567.</p> <p><i>Category B:</i>  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.</p> <ul style="list-style-type: none"> <li>• <b>Assignment:</b> In-class debate 1 (in class). Students not participating in the debate will write a 1000-1200 word essay on the topic (homework).</li> </ul>
Week 11	<i>Review and Exam 2</i>
Week 12	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Future energy Part 1: Storage and Limiting Energy Use</li> <li>• <b>Summary:</b> 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.</li> <li>• <b>Required Readings:</b> Forbes (2020) What's next for Energy Storage Technology?</li> <li>• <b>Assignment:</b> Attendance at guest lecture: Program for Resource Efficient Communities (PREC)/UF Office of Sustainability (in class).</li> </ul>
Week 13	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Future energy Part 2: New technologies</li> <li>• <b>Summary:</b> Case studies of up-and-coming energy technologies from around the world.</li> <li>• <b>Required Readings:</b> Energy In The 21st Century (3rd Edition) by John R Fanchi (2013) (pages 340-347). Available for free online via UF Libraries</li> <li>• <b>Assignment:</b> Exercise 3: Class project: Make a global map of energy pilot projects (in class).</li> </ul>
Week 14	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Future Energy Part 3: Policy and Economics</li> <li>• <b>Summary:</b> Aspects of policy and economics that guide energy production, consumption and development.</li> <li>• <b>Required Readings:</b> 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., &amp; Leiserowitz, A. (2020). Republicans and Democrats differ in why they support renewable energy. <i>Energy Policy</i>, 141, 111448</li> <li>• <b>Assignment:</b> Essay: Watch "The big energy gamble" (available online via UF libraries) <a href="https://www.pbs.org/wgbh/nova/video/the-big-energy-gamble/">https://www.pbs.org/wgbh/nova/video/the-big-energy-gamble/</a> (52 min) and write a short discussion on the pros and cons with California's approach (homework)</li> </ul>
Week 15	<ul style="list-style-type: none"> <li>• <b>Topic:</b> Bringing it all together: is it possible to cover the world's energy needs with renewable energies alone?</li> </ul>

Week	Topics, Homework, and Assignments
	<ul style="list-style-type: none"> <li>• <b>Summary:</b> 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?</li> <li>• <b>Required Readings:</b> Moriarty, P., &amp; Honnery, D. (2016). Can renewable energy power the future?. <i>Energy policy</i>, 93, 3-7. Jacobson, M. Z. (2017). Roadmaps to transition countries to 100% clean, renewable energy for all purposes to curtail global warming, Air Pollution, and Energy Risk. <i>Earth's Future</i>, 5(10), 948-952.</li> <li>• <b>Assignment:</b> In-class debate 2 (in class). Students not participating in the debate will write a 1000-1200 word essay on the topic (homework).</li> </ul>
Week 16	<i>Review and Exam 3</i>

## 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

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### 1. Details of Experiential Learning Component

In week 8 the class 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

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### 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> , 392-1575; and the University Police Department: 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.