

Syllabus

Physics 662/ Public Policy 699B – Fall 2019 Intersections of Technology and Policy in Modernizing the Energy System

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Course web page: www.elms.umd.edu

Class Location:
Tu Th, 9:30-10:45, Room 1116 IPST building (building # 085)

Course Goals and Structure:

The goal of the course is to develop the knowledge and skills for critically evaluating issues in modernizing the energy system, with a key focus on energy innovation that supports mitigation of climate change. Students will work collaboratively to combine technical, economic and policy perspectives.

The course will be structured so that students develop a working knowledge of the context, vocabulary, tools and information sources needed for meaningful assessment of approaches to greenhouse gas reduction. Case studies will be used throughout for illustration, and class time will be balanced between lectures and discussion.

Course Topics:

- Overview of the scale and structure of the energy system, the correlated greenhouse gas emissions, and energy policy approaches.
- Climate change and scenarios of future energy use. Assessing the potential of clean energy technologies to reduce greenhouse gas emissions.
- Economic factors in mitigating climate change: policy vehicles and the costs of clean energy technologies.
- Energy innovation: Development and commercialization pathways, learning curves, who invests, and how techno-economics, policy and regulation influence outcomes.
- Environmental and social drivers: Sustainability, life cycle analysis, socially responsible investing, corporate social responsibility.
- Examples of energy innovation will be used to introduce a variety of clean energy technology & policy approaches, as well as issues in early investment, including venture funding.
- Additional topics to be determined based on student interests.

Texts:

Required texts:

Designing Climate Solutions: A policy Guide for Low-Carbon Energy, H. Harvey, R. Orvis, J. Rissman, Island Press, Washington, 2018

Energy 101, Energy Technology and Policy, by M.E. Webber: available as the Energy 101 Course App for web-based interface
(<https://www.energy101.com/>)

News Feeds:

As part of class participation, students should monitor these daily news feeds during the semester and post a comment on an interesting topic once every two weeks. Each week one student will be selected to give a brief in class presentation on the posted topic.

Energy Information Agency (EIA): Today in Energy (free)
Enroll at: <https://www.eia.gov/tools/emailupdates/>

E&E News: EnergyWire (free if you use your @umd email)
Enroll at: <https://www.eenews.net/subscribe>

Reading:

Readings will be assigned weekly. Material will be available in the reference texts, on the course site or via direct download from the source. Students should read the material ahead of class and come prepared for discussion.

Information sources include:

US Energy Information Agency: <https://www.eia.gov>

International Energy Agency: <https://www.iea.org>

Free downloads available at (<http://www.oecd-ilibrary.org/>)

Advanced Research Projects Agency-Energy: <https://arpa-e.energy.gov/>

2015 Quadrennial Technology Review: <https://energy.gov/under-secretary-science-and-energy/quadrennial-technology-review>

Evaluation:

1. Discussion, news feeds posts and presentation, and in-class activities.
2. Assigned Problems: Two written assignments, prepared by teams of 2 students, during first 1/2 of the course, designed to reinforce topics and skills introduced in class.
3. Final Project proposal: Each student will write a proposal for their part of the Final Team Project. Proposals should indicate how the overall report will be integrated.
4. Final Project: Student teams (2 students per team) will propose an innovative change for the energy system, and use the concepts and tools developed during the course to evaluate its potential climate benefits, and propose technical, economic and policy approaches that could make the change a success.

Grading

Discussion, news feeds and in-class activities: 20%

Assigned problems (2): 30%

Final Project:

Project Proposal (individual score): 15%

Topic Choice Oct 1, draft Oct 22, completed version due Nov. 5

Final Project Paper (team score): 25%

due Dec. 12

Final Project Presentation (team score): 10%

Presentations will be given in the last class sessions, and during the final exam period.

Attendance of all students at the presentations is mandatory.

University policies:

The University has a legal obligation to provide appropriate accommodations for students with documented disabilities. To ascertain what accommodations may need to be provided, students with disabilities should inform me of their needs in the first week of the semester.

Information on other policies can be found here:

<http://www.ugst.umd.edu/courserelatedpolicies.html>

Academic Honesty

Two of the problem assignments and final project are to be completed as a team effort. Each student is expected to make a significant contribution to the completed work. The documents submitted for the projects must include a form (available on course web page) listing the contribution of each of the team members to the completed work, endorsed by all the team members.

Sources of information used in completing the work must be cited clearly. The use of quoted material is discouraged, but if used, should be clearly and completely identified. Adapting material from an external source with wording changes or rearrangement of sentences is plagiarism, so be sure you formulate your own ideas.

For questions about academic honesty, see University policies at:

<http://shc.umd.edu/SHC/Default.aspx>

<http://osc.umd.edu/osc/AcademicDishonesty.aspx>

Informational reading (not required):

- Merchants of Doubt, Naomi Oreske
- The Prize, Daniel Yergin (history of the oil industry)
- The Alchemy of Air, Thomas Hager (the political context of a ground-breaking technical innovation)
- L.E.D.: A History of the Future of Lighting, Bob Johnstone
- Sustainable Energy – without the hot air, David MacKay, 2009
<https://www.withouthotair.com/download.html>
- V. Narayanamurti and T. Odumosu. *Cycles of Invention and Discovery: Rethinking the Endless Frontier*. Cambridge, MA: Harvard University Press, October 2016.