Environmental Studies 12: Energy and the Environment

Spring 2019, 007 Steele
Class: Tu, Th 2:25–4:15 pm
X-hour: W 4:35–5:25 pm

Prof. Andy Friedland
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Course Description:
Energy production and use are responsible for many environmental problems including global climate change, local and regional air and water pollution, and environmental inequities. In 2019, global climate change, relatively low energy prices, the benefits and consequences of natural gas fracking, oil pipelines, transmission lines and the rapid increase in solar- and wind-generated electricity are receiving the most attention.

This course will consider the consequences of using fossil fuels on the natural environment and the benefits and consequences that result from an increase in the use of renewable energy. We will ask what technologies, actions and behaviors might facilitate the speediest transition away from fossil fuels to renewable energy sources and a more sustainable society. We will address these ideas by examining energy basics—physical laws governing energy, natural science effects of energy use, the current US energy portfolio, and the effects of conventional energy on the natural environment—as well as current and potential future lower-carbon and carbon-free energy sources. The goal of this course is to provide an understanding of our current energy situation and the natural and applied science challenges that confront our developed country in achieving a sustainable energy future. Distributive: TAS.

Required Readings:
Wolfson, Richard. 2017. Energy, Environment, and Climate, 3e. W.W. Norton, New York.
Chapters as assigned in syllabus/Canvas. Two copies on reserve in Kresge Library.
Occasional videos and supplementary readings identified on Canvas or given out in class.

Films/Documentaries on Reserve in Jones Media Center:
Merchants of Doubt; The China Syndrome

Course Requirements and Grading:
Course evaluation will be based on a renewable energy brief (15%), a personal carbon audit (15%), a Rapid Assessment Report of a regional energy issue (researched and presented in groups of 3-4 people (5%); brief write-up done alone (10%)), an in-class midterm examination (25%), a take-home final examination (25%), and attendance and participation (5%).

Please read: The Academic Honor Principle applies to all Dartmouth students at all times. I recognize the importance of the Honor Principle and expect you to do so as well. I encourage students with disabilities, including "invisible" disabilities like chronic diseases, learning disabilities, and psychiatric disabilities to discuss with me appropriate accommodations that might be helpful. Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance which conflicts with your participation in the course, please see me before the end of the first week of the term to discuss appropriate accommodations. I recognize that the academic environment at Dartmouth is challenging, that our terms are intensive, and that classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including: your undergraduate dean (http://www.dartmouth.edu/~upperde/), Counseling and Human Development (http://www.dartmouth.edu/~chd/), and the Student Wellness Center (http://www.dartmouth.edu/~healthed/). I encourage you to use these resources and speak with me if you think I can be of help throughout the term.

Class Meetings, Due Dates and Readings

Date	Topic	Reading*
03/26	Introduction and Energy Conversions	Ch 1, 2
03/28	Energy Demand and Production Guest: Douglas McLean, Photojournalist/Videographer "Standing Rock Is Everywhere: Frontline Impacts of Energy Extraction"	Ch 3, 4 (77-88 only)
04/02	Current Fuel Supply and Where We Might Be Soon	Ch 5
04/04	**Field Trip** to The Dartmouth Power Plant *Last Name A-M* Nondepletable Fuel Supply: Solar Generated Electricity	Ch 9
04/09	**Field Trip** to The Dartmouth Power Plant *Last Name N–Z* Nondepletable Fuel Supply: Solar Generated Electricity	Ch 9
04/11	Nondepletable Fuel Supplies: Wind, Hydro	Ch 10: 260-275
04/15	**Monday: Carbon Audit Due at Noon in 113A Steele Hall**	
04/16	The Grid: Smart and Not-So-Smart; Incentivizing Behavior Guest: April Salas, Executive Director Revers Center for Energy at Tuck	Ch 11: 292-307
04/18	Major Consequences of Fossil Fuel Use	Ch 6
04/22	**Monday: Energy Briefing Paper Due at Noon (e-submit)**	
04/23	Energy Storage, Food & Biomass Systems	Canvas
04/25	Energy Sources and Climate Change	Ch 12, 13
04/30	**In-class Exam (closed book)**	
05/02	Climate Change and Merchants of Doubt	Ch 14
05/07	Nuclear-powered Electricity	Ch 7
05/09	Biomass and Carbon Accounting Errors	Ch 10: 276-287
05/13	**Monday: Rapid Assessment of Regional Issue Due (e-submit)**	
05/14	Objectives for A Successful Campus Energy Program Guest: Rosi Kerr, Director, Sustainability Office	Canvas
05/16	Campus Efficiency and Renewable Energy Field Trip Tim McNamara, Assoc. Dir. Facilities & Operations	Canvas
05/21	Weighing All Energy Sources and Costs	Ch 15, 16
05/23	**Regional Issue Synopsis Group Presentations in Class**	
05/28	**Group Presentations continued; Final Class**	
05/28	Take-home final handed out in class	
06/02	**Take-home Final Exam due at noon (Sunday) (e-submit)**	

*My hope is that you will do the reading for a particular date before class time on that date. Items on Canvas are links to website, videos or articles.

Bolded date indicates an assignment is due or exam given that day