

1. EM462 Energy Analysis, Policy, and Security
2. Credit Hours (3) / Contact Hours (3)
3. Course Director – Patrick Caton
4. Course Textbook: There is no required textbook for this class.
5. Specific course information
 - a. Interdisciplinary course with large group focus on energy and energy security from joint engineering, economic, environmental, and policy perspectives. The engineering-focused section will explore the technology of energy systems as it intersects with these other disciplines.
 - b. Prereq: EM317 or EM319 and (1C or 2C standing) or Dept Chair Permission.
 - c. Senior engineering elective course
6. Educational objectives
 - a. Work independently as part of a multi-disciplinary team to analyze complex issues related to the energy mission of the U.S. Navy, national and international energy policy, and the role of energy in national security.
 - b. Demonstrate mastery of key discipline specific energy concepts and analytical tools.
 - c. Understand the strategic importance of energy for the mission of the U.S. military (with special attention given to the USN and USMC).
 - d. Effectively present research findings orally and in written form.
 - e. Apply current energy issues to U.S. national security interests.
7. Specific program outcomes addressed by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Reinforced				X	X		
Mastered	X					X	X

8. Brief list of topics to be covered
 - a. Introduction to energy analysis and energy security
 - b. Global exergy fluxes and reserves
 - c. Fossil fuels in Earth system
 - d. Complex fuel stoichiometry and combustion
 - e. Technology for fossil fuel energy conversion
 - f. Energy security of selected countries around the world
 - g. Renewables in the Earth system
 - h. Solar
 - i. Biomass and Waste-to-Energy
 - j. Wind
 - k. Nuclear in the Earth System

- l. Reactor types and approaches to nuclear energy
- m. Nuclear reprocessing