

**United States Naval Academy
Mechanical Engineering Department**

Catalog Description: EM485F Energy Analysis, Policy, and Security **Credit:** 3 (3-0-3)

Designation: Elective engineering course

An elective course taught in conjunction with three other disciplines (economics, political science, and Earth science) that studies how the science and technology of energy influences short- and long-term international energy security.

Prerequisites: None

Corequisites: None

Textbooks: None

Course Director: Professor Karen Flack

Course Content:

No.	Topic or Subtopic	hrs.
1	Introduction to energy analysis and energy security	9
2	Global energy fluxes and reserves	3
3	Fossil fuels in Earth system	3
4	Complex fuel stoichiometry and combustion	4
5	Technology for fossil fuel energy conversion	4
6	Energy security of selected countries around the world	9
7	Renewables in the Earth system	3
8	Solar	2
9	Biomass and Waste-to-Energy	2
10	Wind	2
11	Nuclear in the Earth System	2
12	Reactor types and approaches to nuclear energy	1
13	Nuclear reprocessing	1

Assessment Methods:

		YES	NO
A	Quizzes	X	
B	Homework	X	
C	Exams	X	
D	Laboratory Reports		X
E	Oral Presentations	X	
F	Design Reports/Notebooks		X
G	Prototypes/Demonstrations		X
H	Projects	X	
I	Other		X

Course Outcomes¹

1. 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. (A, B, C, E, H)
2. Demonstrate mastery of key discipline specific energy concepts and analytical tools. (A, B, C, E, H)
3. Understand the strategic importance of energy for the mission of the U.S. military (with special attention given to the USN and USMC). (E, H)
4. Effectively present research findings orally and in written form. (E, H)
5. Apply current energy issues to U.S. national security and geopolitics. (E, H)

¹ Letters in parenthesis refer to the assessment methods listed in the previous section.

Program Outcomes	Course Outcomes				
	(1)	(2)	(3)	(4)	(5)
(a)	X	X	X	X	X
(b)	X				X
(c)					
(d)	X				
(e)		X			
(f)					
(g)	X			X	
(h)	X		X		X
(i)	X		X		X
(j)	X		X		X
(k)	X	X			

Date of Latest Revision: 8 NOV 2017, Professor Patrick Caton