Energy Security Curriculum at USNA

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With Guest Lecturer Dr. Karen Flack

Professor and former Chair, Department of Mechanical Engineering,
United States Naval Academy, Annapolis, MD

Dr. Karen Flack

Abstract

This seminar will describe an interdisciplinary course in Energy Security at the United States Naval Academy. The objective of the course is to educate upper-level midshipmen with a high-level view of energy analysis, policy, and security, and in particular, how energy affects critical missions of the U.S. military and U.S. national security. The class would involve topics such as (1) underlying energy science, (2) best estimates of energy supplies and current usage profiles, (3) current energy policy in different sectors and policy trends, including salient factors that drive policy such as environmental science and political movements, (4) current technology for energy feedstock harvesting, fuel development, and likely near/middle/long-term technology developments, (5) economics of energy development and usage. Underlying all these topics is the omnipresent question: How do innovation, policy, technology, and economics of energy affect the ability of the U.S. military to successfully and efficiently succeed in its various missions? The goal of the course is to engage a wide scope of midshipmen so that, as future leaders and policy makers, they can lead the military in heading off energy challenges prior to them becoming crises. Faculty from four disciplines (Mechanical Engineering, Oceanography, Economics and Political Science) are participating in the class. The course is currently in its fourth offering with tremendous interest from midshipmen.

Biography

Karen A. Flack is a Professor in the Mechanical Engineering Department at the United States Naval Academy in Annapolis, Maryland. She received a bachelor's degree from Rice University, a master's degree from the University of California, Berkeley and a Ph.D. from Stanford University, all in Mechanical Engineering. Professor Flack teaches courses in thermodynamics, fluid mechanics, heat transfer, as well as wind and tidal power. Her research focuses on turbulent boundary layer physics with a concentration on rough wall boundary layers and frictional drag prediction. Recent work also includes performance characteristics of tidal turbines in unsteady flow conditions. She is on the editorial boards of the *International Journal of Heat and Fluid Flow* and the *Journal of Turbulence*. She is a Fellow of the American Physical Society and has received the following: an ASME award for best paper in the *Journal of Fluids Engineering*, a Pi Tau Sigma teaching award, the Naval Academy Research award and United States government meritorious service medals.