EC3110: Electrical Energy: Present and Emerging Technologies (3 2) / New Course Flyer

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Naval Postgraduate School: Monterey, California.
ENERGY COURSE THIS SPRING QUARTER

EC3110: Electrical Energy: Present and Emerging Technologies (3-2)

Course Description: This course presents electrical energy topics for on shore facilities, expeditionary and ship applications divided into three categories; generation, distribution and consumption. For these three categories the current state of the art is presented first and then expounded with emerging technologies including renewable energy sources, distributed resources, micro-grids, energy management systems, flexible AC transmission systems (FACTS), battery management systems, all electric and hybrid transportation systems, more efficient loads such as lighting, motors and power converters. Hands on laboratories are a key part of the course.

PREREQUISITE: EC2100 or EO2102 or consent of instructor.

Topics:

(1) Electrical energy generation: present and emerging technologies
   - Review conventional energy sources: coal, natural gas, hydroelectric, etc.
   - Alternative energy sources: wind, solar, fuel cells, ocean, energy harvesting.
   - Distributed generation and power conditioning systems

(2) Electrical energy distribution: present and emerging technologies
   - Power flow analysis
   - Flexible AC Transmission systems (FACTS) and high voltage DC (HVDC)
   - Micro-grids for installations and expeditionary applications

(3) Electrical energy consumption: present and emerging technologies
   - Conventional and high efficiency motors
   - Power converters for consumer electronics and variable speed drives
   - Power quality and stability issues
   - Methods to support DoD efforts to reduce energy consumption
   - Electric and hybrid transportation systems

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