A Globally-Oriented Curriculum in Ocean Environmental Engineering

by
Robert H. Mayer, Jennifer K. Waters
U.S. Naval Academy, Annapolis, MD

Abstract:

For the past eight years, the authors have been developing a unique discipline within the ocean engineering major at the U.S. Naval Academy. Ocean Environmental Engineering, as the discipline is known, is defined as the application of engineering and management principles to the conservation of the marine environment and the sustainability of its natural resources. This environmental engineering option finds its essence in two fundamental courses within the major that are complimented by multidisciplinary opportunities in other majors. The first fundamental course, Ocean Environmental Engineering, focuses on marine pollution: its principal causes, effects, and its remediation. The second, Ocean Resources Engineering, emphasizes methods for ocean resource assessment, recovery and utilization. Other environmental engineering opportunities include the capstone design course required of all engineering majors, and elective courses in such disciplines as environmental economics, environmental oceanography, environmental security, and marine environmental engineering. The purpose of this paper is to address the evolution of this environmental engineering option and to describe the content of its two fundamental courses. The paper also provides a brief description of recent environmental-related capstone design projects and reviews topical coverage of selected elective courses.

The key to the success of the environmental option in ocean engineering has been the breadth of topical coverage in the two fundamental courses. In both courses, students are required to research a topic of personal interest related to the disciplines discussed. Recent globally-oriented examples include restoration of Pacific coral reefs; maintenance of world-wide fisheries; environmental and economic health of Manila Bay, Philippines; technological developments in ocean energy resources, advancements in oil-spill mitigation technologies, among others. These and other student research efforts will be also be highlighted in the paper.