

Preparing Non-nuclear Engineers for the Nuclear Field

Elizabeth K. Ervin

The University of Mississippi

EXTENDED ABSTRACT

Environmental, energy, and economic concerns are leading to exploration of sustainable alternative energy as never before. As the greatest user of world energy resources, the United States of America should certainly contribute to energy technological education and development. An understanding of power generation is important for all modern-day engineers, and nuclear energy serves as a good example of a technically viable option that is oft overlooked due to non-technical fears. While global perspectives are shifting, only a limited number of American programs have nuclear-related components. Twenty-four universities have nuclear-related programs, including Nuclear or Radiological Engineering, Nuclear Science, or Nuclear Physics; some are strictly graduate programs related to industrial research and development.

Minimally meeting this educational need, a nuclear-related introductory course complies with common university goals by enhancing engineering curricula, providing more qualified non-nuclear engineers for the nuclear industry, and improving faculty teaching competencies. The only required cost is faculty time, which has been covered at the University of Mississippi by a Nuclear Regulatory Commission Educational Grant. Usually enough interest exists so that at least one instructor will be interested. The resulting nuclear training is an educational benefit for both students and the faculty at large. The appropriate lecturer needs little experience with nuclear systems in particular but does need a broad-based view of complex engineered systems. In fact, the examination of a new technical field may have the added benefit of research stimulation. The development of nuclear engineering education will also improve student recruitment and industrial collaboration. However, participation from the nuclear industry may be a challenge due to confidentiality and security. If possible, industrial plant site tours can contribute to the educational experience by allowing students to see full-scale systems in a practical application.

As an example, the initiation of nuclear technical education at the University of Mississippi is discussed. Acting as a "grabber," nuclear power generation will be employed as the model application of interdisciplinary systems engineering. Promoting technical appreciation rather than apprehension of nuclear technology, the proposed course relates nuclear systems engineering, safe reactor design, infrastructure sustainability, and environmental management. Although this module will not be offered until the fall semester of 2009, course development and assessment plans are discussed from the viewpoint of a professor with nuclear industrial experience. The author intends to publish lessons learned subsequent to the course offering in the *Journal of Engineering Education*.