

Development of a Problem-Based Undergraduate Nuclear Course to Strengthen Math Skills in Support of the U.S. Nuclear Workforce

Executive Summary

Funds are requested for the University of Missouri and Linn State Technical College's Advanced Technology Center to collaboratively develop and implement a college freshman-level nuclear technology course that will use a problem-based learning environment to teach mathematical concepts essential to succeeding in a demanding technical field. The course will also teach basic nuclear theory with the overall course content benchmarked against INPO-ACAD and DOE fundamental training requirements for students interested in seeking further training and/or a career as a nuclear technician in the fields of radiation protection, instrumentation and controls, and reactor operations. Solid skills in nuclear problem solving and mathematics are vital to Nuclear Safety in the commercial nuclear energy industry, as well as other segments of the nuclear sector (including national laboratories, academic institutions, regulatory agencies, and manufacturers utilizing radiation sources).

The proposed course will effectively emulate—in a problem-based context—the math proficiencies taught in the first semester of the enlisted U.S. Navy Nuclear Power School (NPS). The NPS emphasis in the proper application of math principles for problem solving is widely viewed as a key element in enlisted personnel success in the NPS' demanding academic curriculum. The development and implementation of similar coursework to strengthen math skills in a context specific to the nuclear industry is important to undergraduate student success in both two-year and four-year academic programs. This also addresses a training gap that is consistently identified by employers requiring workers with strong math skills and aptitude, competencies that are essential for every nuclear workforce job classification.

This project will result in an industry-driven, web-based course (with printed manual) for immediate implementation by ATC/LSTC and made available for schools with post-secondary programs in nuclear technology or related fields. Additionally, the course will be piloted as a dual-credit college-level course available to qualified high school students, delivered at an area vocational technical school as part of a pre-engineering curriculum.

The primary impact of this project will be increased success rates for students pursuing nuclear technology education and an increased pool of graduates qualified to fill highly skilled manpower gaps in the nuclear workforce. Secondly, this project will generate an increased interest in younger students to pursue nuclear-related careers.