

# **The Science of Nuclear Materials: Development of a Modular, Laboratory-Based Curriculum to Explore the Properties of Nuclear Materials**

## **Executive Summary**

We propose to develop and implement a flexible and modular laboratory-based, year-long course focused on the science of materials relevant to four primary areas: (1) the nuclear fuel cycle, (2) safeguards and security, (3) health and the environment, and (4) materials control and accounting. This proposal presents an outline for the development of a “scenario-based” curriculum wherein real-world examples from each of the four focus areas (modules) drive the course content in terms of the fundamental scientific principles necessary to understand specific challenges. Further, the hands-on laboratory component will provide instruction in the basics of the instrumentation necessary for these particular real-world circumstances, as well as an opportunity for guided inquiry, critical analysis, and problem solving in relevant situations. We have instituted a rigorous plan for assessment not only of student learning but also of the sustainability of the course itself. The period of performance for this effort will be two years: one year for curriculum development followed by one year of implementation into the course offerings at The George Washington University (GW).

Our flexible and modular course outline allows for multiple target audiences, including current GW students, incoming GW freshmen, and Washington, D.C.-based working professionals such as non-technical individuals within the nuclear security and safeguards arena. The latter potentially includes Federal or state regulatory officials, national security policy officials (Departments of Energy, State, Defense, and Homeland Security), industry representatives, and Congressional staff. When considering the latter target audience, we emphasize that this is not intended to be a policy course and that the curriculum is restricted to scientific and technical principles only.

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