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Lessons Learned from Developing the Graduate Nuclear Security Curriculum at the Kyiv Polytechnic Institute

As nuclear fuel cycle activities grow and the amount nuclear material increases worldwide, there will be a similar increasing need to more deeply incorporate nuclear security knowledge, skills, and abilities into nuclear energy workforces across the globe. To address this need, the International Atomic Energy Agency (IAEA) has provided NSS No. 12—Education Programme in Nuclear Security—as a technical guidance document and has created the International Nuclear Security Education Network (INSEN) to facilitate development and implementation of such programs. While both this best international guidance and voluntary engagement network establish a strong foundation for creating an educational capability in nuclear security, each individual nation is responsible for crafting such programs that both meet their specific needs and align with their national educational systems.

In response, the Ministry of Energy and Coal Industry of Ukraine has partnered with the U.S. National Nuclear Security Administration's International Nuclear Security (NNSA/INS) program to develop a graduate curriculum in nuclear security at the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" (KPI). The main criterion of the choice of KPI is the availability of a laboratory base in Kyiv (in the center named after George Kuzmich) and the research reactor BVV-M at the Institute of Nuclear Research of the National Academy of Sciences of Ukraine, which can be used to prepare students. The Ukrainian government also agreed with this approach. Over the past several years, KPI professors have interacted with subject matter experts in multiple nuclear security-related topic areas from both NNSA/INS and Sandia National Laboratories (Sandia) to discuss how to build, implement, and maintain a nuclear security education program. These discussions have leveraged both IAEA-based guidance, Sandia expertise, and KPI's education mandate to identify and develop courses in nuclear security-related topics to help meet the needs of Ukraine's nuclear energy sector. With the support of their various governmental stakeholders, the KPI professors have diligently and effectively crafted a nuclear security curriculum that meets academic requirements across a variety of traditional disciplines, including engineering, physics, chemistry, and political science. Officially launched in the Fall semester of 2019, the KPI graduate program in nuclear security will provide a sustained source of human capacity development and education to meet national and regional nuclear security needs.

This paper will first review the history of collaboration between KPI and NNSA/INS and introduce how these engagements helped shape the progression of the curriculum and the professional development of the program's professors. Next, the structure and description of KPI's nuclear security program will be described, including a summary description of each course and how the learning objectives of each course correspond to the overall goals of the program. Lastly, the paper will provide several lessons learned—from both development process and from the initial implementation stages of KPI's curriculum—to inform (and, hopefully) assist other nations embarking on developing nuclear security education programs.

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State

Ukraine

Gender

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