

A New Approach to Nuclear Security Education



DEVELOPING THE NUCLEAR SECURITY WORKFORCE OF TOMORROW

With nuclear and radiological materials poised to play a significant role in national and international plans to develop safe, secure, clean, and affordable power, and in scientific and medical innovation, it is critical that facility designers, operators, and regulators understand foundational nuclear security.

Embedded in the University of New Mexico (UNM) Nuclear Engineering department, the graduate-level Nuclear Security Program provides students with the theoretical foundations, advanced methodologies, and practical skills required to secure and protect nuclear materials and facilities. UNM partnered with the U.S. Department of Energy National Nuclear Security Administration Office of International Nuclear Security (NNSA-INS) and experts from Sandia, Los Alamos, and Idaho national laboratories to develop coursework that will prepare the next generation of experts to apply advanced engineering capabilities to the nontraditional challenges faced when protecting the nuclear industry of the future.

Nuclear Security Program classes provide participants with foundational knowledge in the following aspects of nuclear security:

- Advanced engineering approaches for designing and evaluating various aspects of nuclear security, including physical protection, material accountancy and control, and cybersecurity
- Current national and international policy, regulations, and governing bodies and their interaction with nuclear security performance
- Ongoing research and development in advanced security technologies, key policy areas, and changing threats
- Opportunities to learn via hands-on security technology demonstrations at Sandia National Laboratories and Los Alamos National Laboratory

Students will receive continuing education units (CEUs) upon course completion.

PARTNERSHIP ENABLES ACCESS TO EXPERTS AND TRAINING

The mission of NNSA-INS is to advance U.S. international efforts to prevent theft and sabotage of nuclear materials and facilities worldwide by partnering with countries and international organizations to secure weapons-usable nuclear materials, nuclear power plants and fuel cycle facilities, research reactors, and materials in transit.

The partnership between UNM, NNSA-INS, and the U.S. national laboratories brought together experts in nuclear engineering, nuclear material and facility security, and curriculum development for a unique learning experience. Nuclear Security Program students will have access to renown international nuclear security experts from multiple U.S. National Laboratories and their unique, real-world training facilities.



CURRICULUM

- **Advanced Nuclear Security Theory & Practice** provides foundational information on securing nuclear material, facilities, and fuel cycle activities, including physical protection systems, cybersecurity, unmanned aerial systems, and the link between facility security, safety, and safeguards.
- **Advanced Nuclear Security System Design & Analysis** applies classic and interdisciplinary engineering design to nuclear security systems, including traditional nuclear power plants, small modular reactors, research reactors, and fuel processing plants, and emulates a typical engineer's working environment in the nuclear security domain.
- **Nuclear Material Accountancy and Control (NMAC)** explains the process of accounting and controlling nuclear materials. Students will be exposed to technical concepts and methods, and they will be faced with open-ended questions and laboratory exercises that will allow them to learn and demonstrate mastery of these concepts.
- **Weapons of Mass Destruction Non-Proliferation Science & Policy** is an introduction to the global non-proliferation environment, arms control, and nuclear security, including U.S. and international agencies responsible for development and implementation of nonproliferation policies, the technical, social, and political dynamics underlying the development of WMD in selected countries, and threats posed by non-state actors.



PREQUISITES

All students enrolling in Nuclear Security Program courses are expected to have an undergraduate degree in nuclear engineering or be an advanced student in this area (post-graduate and doctoral candidates welcome); have completed at least one engineering design project; and have a working knowledge of the nuclear fuel cycle and general operations of traditional nuclear power plants, research reactors, small modular reactors, and reprocessing facilities. Early- and mid-career nuclear engineers working in the nuclear industry, government, or academia are encouraged to attend. Non-traditional students will be considered on a case-by-case basis.

NEW IN 2022:

ADVANCED NUCLEAR SECURITY SUMMER SCHOOL

UNM will offer a two-week, executive-style Nuclear Security Summer School course ([20241-UNMCE-002](#)) focusing on the theory, current practices, advancements in, and design and analysis of nuclear security systems. The course will include both class-based discussion and hands-on experience, with students visiting the renown Nuclear Security Technology Complex at Sandia National Laboratories in Albuquerque.



Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

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