UNM Nuclear Security Program

Advanced Nuclear Security Theory & Practice

ENROLL NOW FOR FALL 2022

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. The Advanced Nuclear Security Theory & Practice course (UNM 20243), part of the UNM Nuclear Security Program, was developed to ensure that the next generation of nuclear security experts are prepared for the challenges of this growing, global industry.

Course Description

This UNM Nuclear Security Program core course provides an advanced, comprehensive overview to the principles, concepts, technologies, and practices responsible for securing nuclear material and nuclear facilities, focusing on all domestic and international nuclear fuel cycle activities. Subject matter experts from UNM and Sandia and Los Alamos National Laboratories, and other guest lecturers will cover a wide variety of topics, including physical protection systems, cybersecurity, unmanned aerial systems, the link between facility security, safety, and safeguards, and more.

Course Goals

This course will increase student understanding of the theoretical foundations for and practical realities of nuclear security, including current and future challenges.

- Basic literacy: Understanding of core concepts and principles, building a base level of literacy on the various aspects of nuclear security
- Interdisciplinary capability: The ability to reach out to adjacent fields in a knowledgeable way and engage with others in assessing the importance of new findings in related fields to nuclear security
- Historical perspective: Understanding of historical and intellectual roots of key concepts and principles in nuclear security
- Critical analysis: Ability to critically assess research and scholarship aimed at furthering knowledge in nuclear security
- Links across domains and methods: Ability to identify links and connections across different fundamental domains and methods relevant to nuclear security.

COURSE DETAILS

Level: Graduate; undergraduates in last year of engineering degree also eligible

Credits:	4 CEUs or 3 graduate credits
Start:	Tuesday, Aug.26, 2022
Times:	Tu/Thu, 2:00-4:30 pm MT
Location:	Online
Cost:	$1200

To register:

- Log on to the UNM Continuing Education website at ce.unm.edu
- Search for Course 20243
- Select Course 20243, Advanced Nuclear Security Theory & Practice
- Review the course description and select Add to Cart
- Pay for the course with a credit card by selecting Checkout; to use a purchase order, call (505) 277-0077

INS International Nuclear Security
Reducing Risk of Nuclear Terrorism

Contact Us
Contact INSinfo@nnsa.doe.gov

Week	Topics
	Core Concepts for Nuclear Security
1	Introduction to Nuclear Security: From theory to practice
2	Threats to Nuclear Security: The Identification, Assessment, Mitigation Loop
3	Nuclear Security: Gates, Guards, & Guns
	Policies and Best Practices for Nuclear Security
4	International Best Practices for Nuclear Security (IAEA/NSS-13): Challenges and Opportunities
5	US Domestic Best Practices for Nuclear Security: Comparing DOE and NRC perspectives
6	Nuclear Security Case Studies
	Current Context & Capabilities for Nuclear Security
7	Nuclear Security System Design: A Basic Systems Engineering Perspective
8	Nuclear Material Accounting & Control (NMAC): Investigative Support for Nuclear Security
9	Modeling and Simulation: Understanding Mathematical Concepts in Nuclear Security
	Advanced Engineering Concepts for Nuclear Security
10	Nuclear Security as a Complex System
11	Nuclear Security in Terms of Probability Theory
12	Nuclear Security in Terms of Human/Systems Interactions & Advanced Human Factors
13	Nuclear Security in Terms of Uncertainty Principles
14	Advanced Approaches to Nuclear Security System Design: Neural Networks & Multilayer Network Models
15	FINAL Presentations

PREQUISITES

Because this course will serve as an advanced, comprehensive overview to the principles, concepts, technologies and practices responsible for securing nuclear material and nuclear facilities, one prerequisite is for participants to be graduate students or in the last year of an undergraduate program. Non-traditional students—including early- and mid-career security and engineering professionals, national laboratory technical staff, and university professors—will also be considered on a case-by-case basis.

THE UNIVERSITY OF NEW MEXICO

Sandia National Laboratories

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. SAND2021-9661 O
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