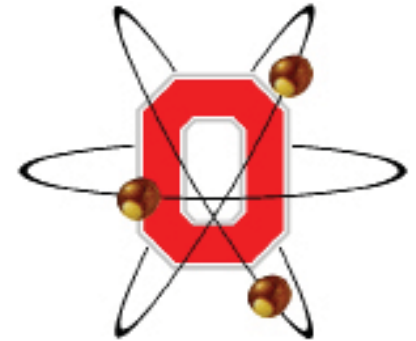




Nuclear Engineering

These are very exciting and challenging times in the nuclear power industry. In response to the emerging crisis of an energy deficit associated with the global environmental impact from greenhouse gases and limits on petroleum availability, operating plants are being granted power uprates and life extensions, new reactor designs are obtaining regulatory certification, new site permits are being granted, a large number of new plant orders are expected over the next few years, and changes in the fuel cycle are being developed that will dramatically reduce the quantity of radioactive waste that will require long-term disposal.



Opportunities for Students

Ohio State's Nuclear Engineering Graduate Program offers a path for master's and doctoral degrees. Students work side by side with the faculty on projects for research sponsors such as the Department of Energy, Nuclear Regulatory Commission, NASA, DOE laboratories and nuclear power plants. The excellent record of publications and patents by faculty and students illustrates the broad scope of the program. The master of science degree in nuclear engineering can be completed in five quarters, allowing the student to move quickly to his or her career. For outstanding engineering undergraduates, the combined BS/MS program offers a way to apply undergraduate optional courses to earn graduate credits and complete the MS degree even more quickly.

About the Program

The Nuclear Engineering Program, part of the Department of Mechanical Engineering at Ohio State's College of Engineering, is designed to prepare students for successful careers in many different specialty areas associated with the application of radiation, radioactive materials and nuclear fission, such as nuclear power, nuclear medicine, radiation safety and environmental management. Our graduates are in demand and work for a variety of employers including electric utilities, nuclear power plants, research laboratories, academic institutions, design organizations, medical facilities, regulatory agencies and providers of equipment and services for the nuclear industry.

Research

The Ohio State University Nuclear Engineering Program has established and developed nine broad areas of technical specialization:

Nuclear Fuel Cycle and Waste Management	Radiation Protection
Nuclear Instrumentation and Control	Risk and Reliability
Nuclear Medical Instrumentation	Safety Analysis
Nuclear Power Plant Engineering and Operations	Thermal and Fluids Science
Nuclear Reactor Core Design Computational Methods	

Current research opportunities include boron neutron capture cancer therapy (BNCT) and neutron dosimetry; accelerator-based neutron source design for BNCT; reliability and risk analysis; radiation protection; heat transfer and thermal hydraulics; fiber optic detectors and data transmission in nuclear power plants; nuclear waste management; digital safety system in nuclear power reactors; fiber optics based instruments channel performance in radiation environment; and in-core measurement. The Ohio State University is a partner in the consortium that operates the Idaho National Laboratory (INL), the Department of Energy's lead laboratory for the development of new reactor designs. Within the consortium, Ohio State operates the Academic Center of Excellence for Instrumentation, Control and Safety.

Learn more online

Nuclear Engineering
Graduate Program
<http://nuclear.osu.edu/>

Contact

Dr. Tunc Aldemir
Interim Chair, Nuclear Engineering
Graduate Studies
614-292-4627
aldemir.1@osu.edu

Grace Hines
Graduate Program Contact
614-292-8519
nuclear@osu.edu



The \$72.5 million Scott Laboratory is a high-tech, state-of-the-art facility that features attractive student lounges, conference centers, machine shops and laboratories for students.

Nuclear Reactor Laboratory

Our research reactor, in operation since 1961, is a pool-type reactor that is utilized for a variety of instructional, research and service activities. It is licensed to operate at continuously variable thermal power up to a maximum of 500 kilowatts, and at maximum steady state power, the average thermal neutron flux in the core is approximately 5×10^{12} n/cm²/s. The reactor is immersed in a pool of light water that provides moderation and cooling by natural convective flow. In addition to the reactor, the Ohio State University Nuclear Reactor Laboratory houses a professional gamma-ray spectroscopy system and two gamma irradiators.

Our facility is used for a wide range of research endeavors, including neutron activation analysis (NAA), radiation-damage evaluation for electronic components and for other materials, evaluation of neutron and radiation sensitive detectors, isotope production and biomedical experiments. The Ohio State Nuclear Reactor Laboratory provides a variety of instructional services ranging from general tours to individual and group laboratory sessions and research projects structured to student and faculty interests.

Faculty Listing

ALDEMIR, Tunc - probabilistic risk assessment, probabilistic system dynamics, maintenance optimization, numerical methods, and nuclear plant dynamics. (PhD: Univ. of Illinois)

BLUE, Thomas - space nuclear systems, advanced nuclear reactor instrumentation, including semiconductor sensors, static and dynamic characterization of radiation-induced degradation of semiconductor power devices, accelerator-based Boron Neutron Capture Therapy (BNCT) for cancer. (PhD: Univ. of Michigan)

CHRISTENSEN, Richard - inherently safe reactor design, thermodynamics, two-phase flow and enhanced heat transfer. (PhD: Stanford), Emeritus

DENNING, Richard - reactor safety, probabilistic risk assessment, behavior of severe accidents in nuclear plants, design of inherently safe reactors. (PhD: Univ. of Florida)

Course Information

The following list of core courses are required of all master's degree candidates:

Introduction to Nuclear Science and Engineering (NE/ME 505)
Radiological Safety (NE 606)
Reactor Theory I (NE 704)
Nuclear Power Plants (NE/ME 736)
Nuclear Radiations and Their Measurements (NE 742)
Nuclear Radiations and Their Shielding (NE 743)
Nuclear Reactor Laboratory (NE 744)
Nuclear Engineering Design (NE 766)

In collaboration with an advisor, the student then selects an area of specialization. A number of elective courses are available to support one's specialized education including: Radioactive Waste Management, Nuclear Fuel Cycles, Power Plant Operations (I and II), Heat Transfer Applications in Nuclear Reactor Systems, Reactor Dynamics and Control, Reactor Theory II, Probabilistic Risk Assessment, Numerical Methods in Particle Diffusion, Heat Transfer and Radiation, Two-Phase Flow, Nuclear Instrumentation, Reactor Safety (I and II), Nuclear Materials, Nuclear Criticality Safety, and Nuclear Security.

HAJEK, Brian - reactor operations, nuclear instrumentation, and hydraulics and measurements, and has done research in reactor simulations, artificial intelligence applications, safety system design, neutron radiography, neutron activation analysis, core flux mapping, and gang-mode rod movements in an operating BWR. (M.S.: The Ohio State Univ.)

MILLER, Don - nuclear power plant instrumentation and control (I&C) systems emphasizing the introduction of advanced technology, computer-based safety and control systems, and applications of fiber optics in nuclear power plants. (PhD: The Ohio State Univ.), Emeritus

SMIDTS, Carol - nuclear systems, probabilistic risk assessment, software reliability, software testing, software safety and digital systems reliability. (PhD: Bruxelles, Belgium)

SUN, Xiaodong - thermal-hydraulics and reactor safety, two-phase flow and instrumentation, boiling and condensation, interfacial area transport and bubble dynamics, and high-temperature compact heat exchangers (PhD: Purdue)

Graduate Applications

Applications to Ohio State University must be submitted online. Please visit the Ohio State University Office of Graduate Admissions Web site, <http://www.gradapply.osu.edu>, to apply online with a credit card.

