

# ONLINE MASTER OF NUCLEAR ENGINEERING

Purdue University's online Master of Nuclear Engineering degree (MNE) is conveniently designed for professional engineers looking to advance their skills without disrupting their careers. The same renowned Purdue Nuclear Engineering faculty who teach the on-campus nuclear engineering graduate degree also teach the 30-credit hour online Master's degree. The Master of Nuclear Engineering degree offers a wide range of flexibility in course options. After students begin their program at Purdue, an academic advisor assists them in creating a plan of study (POS) that best fits their educational needs and career goals.

Below is an evolving list of online nuclear engineering courses. An updated list of online engineering courses can be found at [engineering.purdue.edu/online/courses/school\\_listings](http://engineering.purdue.edu/online/courses/school_listings).

## ***Nuclear Engineering Principles***

The first course for graduate students desiring a nuclear engineering sequence and an elective for students in science or engineering. The course is structured in four parts: Nuclear structure and radiation, biological effects and medical applications of radiation; basics of neutron and reactor physics, neutron diffusion and reactor criticality; nuclear materials and waste; and reactor systems and safety.

## ***Nuclear Reactor Theory***

This course teaches the methodologies of neutron flux calculations, diffusion and slowing down theory, flux separation, material buckling, resonance absorption, Doppler effect, 2-group and multi-group theories, and reactivity balances for design and operation. It provides an introduction to reactor kinetics, delayed neutrons, point reactor kinetics, transient behavior, load changes, reactivity feedback, and safety implications.

## ***Mass, Momentum, and Energy Transfer in Energy Systems***

This course covers formulations for analyzing complicated thermal-hydraulic phenomena in energy systems. Course topics include: Derivation of two-phase flow field equations and constitutive relations; Thermal-hydraulic modeling of nuclear reactor systems; Analyses of nuclear reactor safety-related phenomena based on conservation principles.

## ***Fuzzy Approaches in Engineering***

Course topics include: Intellectual Framework, basics, Fuzzy Models and Formal Structures, Fuzzy Control, General Principles of Rule-Based Systems Development and Limitations, and Advanced Topics.

## ***Nuclear Engineering Systems***

A second course for graduate students desiring a nuclear engineering sequence and an elective for students in science or engineering. Course topics include: principles and practice of nuclear power plant systems with design applications, reactor kinetics, reactor control, radiation protection, shielding, nuclear fuels, fuel cycles, waste management, thermal cycles, heat transport, thermal hydraulics, reactor accidents, and safety analysis.

## ***Neural Computer in Engineering***

The course presents the mathematical fundamentals of computing with neural networks and a survey of engineering applications. Computational metaphors from biological neurons serve as the basis for artificial neural networks modeling complex, non-linear and ill-posed problems. Applications emphasize the engineering utilization of neural computing to diagnostics, control, safety, and decision-making problems. Course topics include: Basics, Backpropagation, and Related Training Algorithms, Feedback and Other Special Neural Networks, Dynamic Neural Networks and Control Systems, Practical Aspects of Using Neural Networks, and Advanced Topics

## ***Big Data and Machine Learning in Engineering***

This course familiarizes students with key information technologies and their underlying methods and techniques that are used to store, manipulate, analyze and exploit large volumes of data with an emphasis in engineering applications and particularly nuclear data.

**LEARN MORE**

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