Nuclear Engineering (NUC E)

Courses primarily for undergraduates:

NUC E 401. Nuclear Radiation Theory and Engineering.
(3-0) Cr. 3. F. *Prereq: PHYS 222, MATH 266 or MATH 267*
Atomic and nuclear physics. Radioactivity and reaction rates. Cross sections. Introduction to neutron diffusion theory. Engineering applications of radiation theory. Nonmajor graduate credit.

NUC E 402. Nuclear Reactor Engineering.
(3-0) Cr. 3. S. *Prereq: NUC E 401*
WWW only. Fission and chain reactions. Neutron diffusion and moderation. Reactor equations. Fermi Age theory. Multigroup and multiregional analysis.

NUC E 405. Radiation Protection and Shielding.
(3-0) Cr. 3. *Prereq: NUC E 401*
WWW only. Basic principles and concepts of radiation protection and design: dosimetric units and response functions, hazards of radiation dose, radiation sources, basic methods for dose evaluation, and shielding design techniques for photons and neurons.

NUC E 410. Nuclear Reactor Theory.
(3-0) Cr. 3. F. *Prereq: NUC E 401*
WWW only. An introduction to neutron diffusion theory, neutron moderation, conditions for criticality of nuclear reactors.

NUC E 411. Nuclear Reactor Analysis.
(3-0) Cr. 3. S. *Prereq: NUC E 410*
WWW only. Group diffusion method. Multiregion reactors, heterogeneous reactors. Reactor kinetics, changes in reactivity.

NUC E 430. Nuclear Energy and Society.
(3-0) Cr. 3. Alt. S., offered 2012. *Prereq: NUC E 401*
The relationship between nuclear energy and society is examined from the perspective of significant events in the commercial nuclear power industry. Event analysis includes differences and similarities of technologies along with environmental impact. Political, social, media and regulatory responses for each event are discussed along with the impact on future plant design. Nonmajor graduate credit.

NUC E 441. Probabilistic Risk Assessment.
(3-0) Cr. 3. S. *Prereq: STAT 305 or equivalent*
Methods for analysis of nuclear power systems. Fault tree and event tree analysis methods. Mathematical basics for dealing with reliability data, theory, and analysis. Case studies of accidents in nuclear power systems. Nonmajor graduate credit.

NUC E 461. Radiation Detection, Measurement and Simulation.
(3-0) Cr. 3. S. *Prereq: NUC E 401*
Principles of nuclear radiation safety and detection. Radiation energy spectroscopy. Counting statistics and error analysis. Monte Carlo simulation of radiation transport. Detection system performance parameters. Design projects. Nonmajor graduate credit.

NUC E 490. Independent Study.
Cr. 1-3. Repeatable, maximum of 3 credits. *Prereq: Junior Classification*
Investigation of nuclear engineering topics. Election of course and topic must be approved in advance by supervising faculty.