NUCLEAR & RADIOLOGICAL ENGR (NRE)

NRE 2110. Introduction to Nuclear and Radiological Engineering. 2 Credit Hours.
Introduction to nuclear and radiological engineering; nuclear energy production and radiation technologies and their role of importance to society, their environmental impact.

NRE 2698. Undergraduate Research Assistantship. 1-12 Credit Hours.
Independent research conducted under the guidance of a faculty member.

NRE 2699. Undergraduate Research. 1-12 Credit Hours.
Independent research conducted under the guidance of a faculty member.

NRE 3112. Nuclear Radiation Detection. 3 Credit Hours.

NRE 3208. Nuclear Reactor Phys I. 3 Credit Hours.
Intermediate treatment of reactor physics and associated advanced mathematics topics.

NRE 3212. Fundamentals of Nuclear and Radiological Engineering. 3 Credit Hours.
Intermediate treatment of nuclear and radiological engineering, with emphasis on reactor physics and engineering, radiation protection, and radiation shielding.

NRE 3301. Radiation Physics. 3 Credit Hours.
Characteristics of atomic and nuclear radiations, transition probabilities, radioactivity, classical and quantum-mechanical derivations of cross sections, interactions of photon, neutron, and charged particles with matter.

NRE 3316. Radiation Protection Engineering. 3 Credit Hours.
Covers radiation dosimetry, biological effects of radiation, radiation-protection criteria and exposure limits, external radiation protection, internal radiation protection, and sources of human exposure.

NRE 3XXX. Nuclear&Rad Eng Elective. 1-21 Credit Hours.

NRE 4206. Radiation Physics Laboratory. 2 Credit Hours.
Measurements of reactor parameters, such as approach to criticality, flux mapping, buckling, and diffusion length using subcritical assemblies. Neutron spectral measurements, shield transmission measurements, and other radiation field measurements.

NRE 4208. Nuclear Reactor Physics II. 4 Credit Hours.
Advanced treatment of reactor physics and associated advanced mathematics topics. Students may not receive credit for both NRE 4208 and NRE 4202.

NRE 4214. Reactor Engineering. 3 Credit Hours.
Nuclear heat generation, fuel elements' thermal analysis; single and two-phase flow and heat transfer in reactor systems; core thermal design and treatment of uncertainties.

NRE 4232. Nuclear and Radiological Engineering Design. 4 Credit Hours.
Introduction to the methodologies of nuclear and radiological design. An open-ended design project that integrates all relevant engineering aspects is to be completed in this course.

NRE 4234. Nuclear Criticality Safety Engineering. 3 Credit Hours.
This course covers the theoretical concepts, the computational techniques, and the principal methods of criticality safety.

NRE 4266. Light Water Reactor Technology. 3 Credit Hours.
A systematic survey of the technology of both pressurized and boiling water reactors with emphasis on the nuclear steam supply system and its associated safety and control systems.

NRE 4328. Radiation Sources and Applications. 3 Credit Hours.
Radiation Sources. Radioisotope production. Application of radiation and radioisotope technology in industry and medicine.

NRE 4404. Radiological Assessment and Waste Management. 3 Credit Hours.

NRE 4430. Nuclear Regulatory Requirements. 2 Credit Hours.
This course introduces regulatory organizations and delineates their jurisdictions. It covers the fundamentals of regulations, the impacts on occupational workers, the public, and the environment.

NRE 4610. Introduction to Plasma Physics and Fusion Engineering. 3 Credit Hours.
A first course in plasma physics and magnetic confinement fusion: basic plasma physics, magnetic confinement concepts, fusion engineering, and a review of the current status of fusion research.

NRE 4698. Undergraduate Research Assistantship. 1-12 Credit Hours.
Independent research conducted under the guidance of a faculty member.

NRE 4699. Undergraduate Research. 1-12 Credit Hours.
Independent research conducted under the guidance of a faculty member.

NRE 4750. Diagnostic Imaging Physics. 3 Credit Hours.
Physics and image formation methods for conventional X-ray CT, nuclear medicine, and magnetic resonance and ultrasound imaging.

NRE 4770. Nuclear Chemical Engineering. 3 Credit Hours.
This course surveys the chemical engineering aspects of nuclear power. Topics include nuclear reactions, fuel cycles, solvent extraction of metals, the properties of actinides and other irradiated fuel materials, fuel reprocessing, and radioactive waste management. Crosslisted with CHE 4770.

NRE 4801. Special Topics. 1 Credit Hour.
Special topic offerings of current interest not included in regular courses.

NRE 4802. Special Topics. 2 Credit Hours.
Special topic offerings of current interest not included in regular courses.

NRE 4803. Special Topics. 3 Credit Hours.
Special topic offerings of current interest not included in regular courses.

NRE 4804. Special Topics. 4 Credit Hours.
Special topics offerings of current interest not included in regular courses.

NRE 4805. Special Topics. 5 Credit Hours.
Special topic offerings of current interest not included in regular courses.

NRE 4901. Special Problems. 1-21 Credit Hours.

NRE 4902. Special Problems. 1-21 Credit Hours.

NRE 4903. Special Problems. 1-21 Credit Hours.

NRE 4XXX. Nuclear&Rad Eng Elective. 1-21 Credit Hours.