NUCLEAR, PLASMA, AND RADIOLICAL ENGINEERING: POWER, SAFETY & ENVIRONMENT, BS

for the degree of Bachelor of Science in Nuclear, Plasma, & Radiological Engineering with a concentration in Power, Safety & Environment

Nuclear, plasma, and radiological engineering encompasses a broad and diverse but complimentary set of engineering disciplines with a wide variety of applications. The first two years of the NPREF curriculum provides a strong foundation in sciences (physics, mathematics, and chemistry), in engineering (mechanics and thermodynamics), in computer use, and in nuclear energy systems. Most of the technical core and concentration coursework takes place in the third and fourth years of the curriculum. Students choose from among three concentrations: power, safety and the environment; plasma and fusion science and engineering; and radiological, medical and instrumentation applications. Each concentration requires students acquire a depth of understanding of the area but with flexibility to develop advanced technical expertise depending upon the student’s specific educational and professional interests. Students demonstrate proficiency in the engineering design process in a senior design capstone course.

The power, safety and the environment concentration focuses on continued safe and reliable nuclear energy production. This relies on multifaceted engineering disciplines for design and analysis of large complex systems. Areas of scholarship and research in which students are involved include but are not limited to: advanced reactor design and safety, reactor physics and thermal-hydraulics, nuclear materials, instrumentation and controls, training and education, fuel design and performance, waste management, reactor accident analysis, risk and reliability, probabilistic risk assessment, human factors, validation and verification, uncertainty analysis, energy and security, and nonproliferation. Cross-cutting areas of study and research include modeling and simulation and numerical analysis and computational methods. Students confer with their academic advisor on a chosen course set to ensure that a strong program is achieved. Technical electives are chosen from among NPREF courses and courses outside the department in the subfields of: thermal sciences; power and control systems; solid, fluid and continuum mechanics; computational sciences and engineering, and environmental engineering and science. The program prepares graduates for positions in industry, research laboratories, federal and regulatory agencies, as well for further graduate study.