NUCLEAR, PLASMA, AND RADIOLOGICAL ENGINEERING:
PLASMA & FUSION SCIENCE & ENGINEERING, BS

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

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 NPRE 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 plasma and fusion science and engineering concentration focuses on plasma processing for a myriad of applications including semiconductor production and on harnessing the power of nuclear fusion. Areas of scholarship and research in which students are involved include but are not limited to: plasma physics and fusion, plasma material interactions, plasma modeling, plasma code development, atmospheric plasma, extreme ultraviolet lithography and physical vapor deposition, plasma processing of semiconductors, fusion materials, plasma nanosynthesis, plasma sources and processing, and plasma manufacturing. Exploration of the plasma science and fusion areas involves both computational and experimental approaches. Students are exposed to modeling and simulation and numerical analysis and computational methods as well as to hands on experiments in a physical laboratory setting. 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 NPRE courses and courses outside the department in the subfields of physical science, electrical engineering, and electronic materials. The program prepares graduates for positions in semiconductor industry, research laboratories and federal and regulatory agencies as well for further graduate study.

Current Program Educational Objectives (https://npre.illinois.edu/academics/undergraduate/program-educational-objectives/)

Information listed in this catalog is current as of 08/2022