NUCLEAR, PLASMA & RADIOLOGICAL ENGINEERING, MS

for the degree of Master of Science in Nuclear, Plasma & Radiological Engineering

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overview of admissions & requirements: https://npre.illinois.edu/admissions/graduate (https://npre.illinois.edu/admissions/graduate/)
overview of grad college admissions & requirements: https://grad.illinois.edu/admissions/apply (https://grad.illinois.edu/admissions/apply/)
department website: http://npre.illinois.edu (https://npre.illinois.edu/)
program website: https://npre.illinois.edu/academics/graduate (https://npre.illinois.edu/academics/graduate/)
department faculty: https://npre.illinois.edu/people/faculty (https://npre.illinois.edu/people/faculty/)
college website: https://grainger.illinois.edu/
contact: Kristie Stramaski (kstram20@illinois.edu)
address: 218 Talbot Laboratory, 104 S Wright St, Urbana, IL 61801
phone: (217) 300-5517
email: nuclear@illinois.edu

Opportunity exists for specializing in computational science and engineering via the Computational Science & Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/) optional graduate concentration.

Admission Requirements

Application for admissions to the master's and doctoral degree programs is open to all graduates in engineering, mathematics, and the physical sciences with a grade point average of at least 3.00 (A = 4.00) for the last two years of undergraduate work and any graduate work completed. Prerequisites for admission include a course in ordinary differential equations plus one other mathematics course beyond calculus; an intermediate course in atomic and nuclear physics or interaction of radiation with matter; a course in electrical circuit theory; a course in thermodynamics; a course in fluid mechanics or continuum mechanics; and a course introducing nuclear engineering. A student may be admitted before completion of these prerequisites, but he or she must allow additional time to make up for these deficiencies; courses taken to make up such deficiencies will not count toward the number of units required for the graduate degree. Transcripts and letters of recommendation are required. The Graduate Record Exam (GRE) (http://www.ets.org/) is required. Information such as undergraduate class rank is recommended.

For full consideration of fall admission with financial aid, application receipt deadline is January 1st. Students who wish to enter in the spring term should contact the Department before applying. For full consideration of spring admission with financial aid, application receipt deadline is October 15th.

All applicants whose native language is not English are required to submit TOEFL (http://www.toefl.org/) or International English Language Testing System (IELTS) (http://www.ielts.org/) scores as evidence of English proficiency. Minimum admission requirements (https://grad.illinois.edu/admissions/instructions/04c/) are set by the Graduate College.

Financial Aid

Most graduate students receive some form of financial aid. Fellowships (https://grad.illinois.edu/fellowships/about/) are available to support the best applicants. Other students are supported on teaching or research assistantships (https://grad.illinois.edu/assistantships/). Financial aid includes federally sponsored traineeships and fellowships and University and industry fellowships. The University is approved for several fellowships including those from the Department of Energy, Nuclear Regulatory Commission, the National Science Foundation, the Hertz Foundation and others. Part- and full-time assistantships include tuition and partial fee waivers.

All applicants, regardless of US citizenship, whose native language is not English and who wish to be considered for teaching assistantships must demonstrate spoken English language proficiency (http://grad.illinois.edu/admissions/taengprof.htm) by achieving a minimum score of 24 on the speaking subsection of the TOEFL iBT or 8 on the speaking subsection of the IELTS. For students who are unable to take the iBT or IELTS, a minimum score of 4CP is required on the EPI test (http://cte.illinois.edu/testing/oral_eng/epi_overview.html), offered on campus. All new teaching assistants are required to participate in the Graduate Academy for College Teaching (https://citl.illinois.edu/citl-101/teaching-learning/grad-academy-for-college-teaching/) conducted prior to the start of the semester.

Department Research

Research activities in the Department of NPRE encompass a diverse range of investigation and challenge areas as described on the department's research area website (https://npre.illinois.edu/research/areas/), these include but are not limited to: nuclear science and engineering, radiation processes and transport, materials science, thermal sciences, systems engineering, energy conversion processes and systems, plasma sciences and processing, fusion energy, radiation-based medical imaging and therapy, dosimetry and radiation protection, radiation detection analysis, reliability and risk analysis, energy systems, and international security. Graduate students in the Department are active participants and contributors to these areas of education and research and typically pursue careers in one of these areas. Graduate students in the Department are also encouraged to take part in course work and research activities in other engineering and science departments to complement their professional development in the nuclear engineering field. Faculty in other related fields are available to supervise research for students through formal "affiliate faculty" appointments.

A wide range of major research resources are available for nuclear engineering research. These are described at the department's research facilities website (https://npre.illinois.edu/research/facilities/).

Other Graduate Programs in the Department of Nuclear, Plasma & Radiological Engineering

degrees:

Nuclear, Plasma, & Radiological Engineering, PhD (http://catalog.illinois.edu/graduate/engineering/nuclear-plasma-radiological-engineering-phd/)
optional concentrations:
Computational Science & Engineering (http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/)

concentrations:

Energy Systems (http://catalog.illinois.edu/graduate/engineering/engineering-meng/energy-systems/)
available for:
Engineering, MENG (http://catalog.illinois.edu/graduate/engineering/engineering-meng/)
Plasma Engineering (http://catalog.illinois.edu/graduate/engineering/engineering-meng/plasma-engineering/)
available for:
Engineering, MENG (http://catalog.illinois.edu/graduate/engineering/engineering-meng/)

The Department of Nuclear, Plasma & Radiological Engineering (NPRE) offers programs leading to degrees of Master of Science and Doctor of Philosophy in Nuclear, Plasma & Radiological Engineering, as well as Master of Engineering in Engineering with a Concentration in Energy Systems or a Concentration in Plasma Engineering. The Master of Science and Doctor of Philosophy degree programs are centered around five theme areas:

- nuclear power
- plasma physics and fusion
- radiological science
- materials science
- reliability and risk

Advanced course work and active research programs are offered in all of these areas.

Opportunity also exists for specializing in energy and sustainability engineering via the

Energy and Sustainability Engineering (EaSE) Graduate Certificate Option (http://ease.illinois.edu/)

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The MS degree takes at least two semesters and a summer session to complete and normally takes three semesters and a summer session. The curriculum requires courses covering the fundamentals of nuclear engineering and interaction of radiation with matter, plus additional courses in an area of concentration chosen by the student in consultation with an advisor. Typical areas are:

- fission engineering including reactor physics and radiation transport
- reactor analysis, thermal hydraulics, and reactor safety
- fuel cycles, radiation effects, and radioactive waste management
- fusion engineering and technology
- plasma engineering and processing
- nuclear materials, corrosion, and irradiation damage
- neutron scattering
- nuclear nonproliferation and public policy issues
- radiation detector development and homeland security applications
- biomedical imaging, MRI applications, radiation protection, radiation-based therapy, and health physics
- reliability and risk analysis and probabilistic risk assessment
- computational methods including Lie Group, integral-differential equation, Monte Carlo, big data and fuzzy logic applications.

For additional details and requirements refer to the department's printed handbook and the Graduate College Handbook *(*http://grad.illinois.edu/gradhandbook/*).*

Requirements

Code	Title	Hours
NPRE 599	Thesis Research (min-max applied toward degree)	4-8
NPRE 501 & NPRE 521	Fundamentals of Nuclear Engrg and Interact of Radiation w/Matter	8
NPRE 596	Seminar in Nuclear Sci & Engrg (registration for 1 hour every semester while in residence; credit does not apply toward the degree.)	0
Two or more NPRE courses in an area of concentration		8
Additional 500-level courses		8
Elective courses (subject to Other Requirements and Conditions below)		0-4
Total Hours		32

Other Requirements and Conditions

Requirement	Description
Other Requirements and Conditions may overlap	
Credit in NPRE 402 or NPRE 446 does not count toward the degree.	
Minimum GPA:	2.75