

# NUCLEAR ENGINEERING

<b>Graduate Program Head</b>	Jon Schwantes
<b>Program Code</b>	NUCE
<b>Campus(es)</b>	University Park (Ph.D., M.S., M.Eng.) World Campus (M.Eng.)
<b>Degrees Conferred</b>	Doctor of Philosophy (Ph.D.) Master of Science (M.S.) Master of Engineering (M.Eng.)
<b>The Graduate Faculty</b>	View ( <a href="https://secure.gradsch.psu.edu/gpms/?searchType=fac&amp;prog=NUCE">https://secure.gradsch.psu.edu/gpms/?searchType=fac&amp;prog=NUCE</a> )

Research areas include:

- Nuclear Science and Applications
- Nuclear Materials
- Nuclear Thermal Hydraulics
- Reactor Physics and Advanced Reactor Design
- Plasma Physics and Engineering
- Nuclear Security, Safeguards, and Safety
- Nuclear Fuel Cycle

Application areas include:

- Advanced Reactor Design
- Nuclear Safety Analysis
- Radiation Instrumentation Development
- Space Nuclear
- Nuclear Nonproliferation Safety and Security
- Plasma Technologies
- Fusion Reactor Design
- Advanced Thermal Hydraulic Modeling
- Neutron Imaging

## Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (<https://gradschool.psu.edu/graduate-admissions/how-to-apply/>). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions Policies (<https://gradschool.psu.edu/graduate-education-policies/>).

Students with a 3.00 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. Scores from the Graduate Record Examination (GRE) test results are optional. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

Letters of recommendation and a statement of purpose written by the applicant are also required to complete the application package.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (<https://gradschool.psu.edu/graduate-education-policies/gcac/>

[gcac-300/gcac-305-admission-requirements-international-students/](https://gradschool.psu.edu/graduate-education-policies/gcac-300/gcac-305-admission-requirements-international-students/)) for more information.

## Degree Requirements

### Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Policies (<https://gradschool.psu.edu/graduate-education-policies/>).

The M.Eng. degree is a nonthesis professional master's degree. In the M.Eng. degree program, a minimum of 30 credits at the 400, 500, or 800 level is required. Twelve of those credits must be in Nuclear Engineering with at least 18 credits at the 500 level. There are 6 credits required in the following core courses: NUCE 403 Advanced Reactor Design (3 cr.) and NUCE 450 Radiation Detection and Measurement (3 cr.). These may be waived as required courses at the discretion of the program if the student has already taken them or equivalent courses. The culminating experience for the M.Eng. degree is a scholarly paper completed while the student is enrolled in NUCE 596. The scholarly paper must be approved by the adviser, a faculty reader, and the program chair.

### Nuclear Security Option

An option in Nuclear Security is available for either the M.S. or the M.Eng. degree. To complete the option, students must complete 15 credits:

Code	Title	Credits
<b>Required Courses</b>		
NUCE 441	Nuclear Security Threat Analysis and Assessments	3
NUCE 442	Nuclear Security System Design	3
NUCE 542	Source and Detector Technologies for Nuclear Security	3
NUCE 543	Nuclear Security Education Laboratory	3
NUCE 544	Global Nuclear Security Policies	3
<b>Total Credits</b>		<b>15</b>

### Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<https://gradschool.psu.edu/graduate-education-policies/>)

The M.S. degree program is designed for students to gain advanced knowledge for research, analysis, and design in nuclear engineering. Students pursuing an M.S. degree must complete a minimum of 30 credits at the 400, 500, 600, or 800 levels, with at least 18 credits at the 500 and 600 level, combined. The program requires 6 credits in the following core courses: NUCE 403 Advanced Reactor Design (3 cr.) and NUCE 450 Radiation Detection and Measurement (3 cr.). These may be waived as required courses at the discretion of the program if the student has already taken them or equivalent courses. Students are required to write a thesis, and at least 6 credits in thesis research (NUCE 600 or NUCE 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School.

### Nuclear Security Option

An option in Nuclear Security is available for either the M.S. or the M.Eng. degree. To complete the option, students must complete 15 credits:

Code	Title	Credits
<b>Required Courses</b>		
NUCE 441	Nuclear Security Threat Analysis and Assessments	3
NUCE 442	Nuclear Security System Design	3
NUCE 542	Source and Detector Technologies for Nuclear Security	3
NUCE 543	Nuclear Security Education Laboratory	3
NUCE 544	Global Nuclear Security Policies	3
<b>Total Credits</b>		<b>15</b>

## Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<https://gradschool.psu.edu/graduate-education-policies/>)

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. The Ph.D. program is quite flexible, with minimal formal requirements. Doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). Generally, a Ph.D. student must have 30 credits above a master's degree before taking a comprehensive examination. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School.

## Minor

A graduate minor is available in any approved graduate major or dual-title program. The default requirements for a graduate minor are stated in Graduate Council policies listed under GCAC-600 Research Degree Policies (<https://gradschool.psu.edu/graduate-education-policies/>) and GCAC-700 Professional Degree Policies (<https://gradschool.psu.edu/graduate-education-policies/>), depending on the type of degree the student is pursuing:

- GCAC-611 Minor - Research Doctorate (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-611-minor-research-doctorate/>)
- GCAC-641 Minor - Research Master's (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-641-minor-research-masters/>)
- GCAC-709 Minor - Professional Doctorate (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-709-professional-doctoral-minor/>)
- GCAC-741 Minor - Professional Master's (<https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/gcac-741-masters-minor-professional/>)

## Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (<https://gradschool.psu.edu/graduate-funding/>) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (<https://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-901-graduate-assistants/>) set by The Graduate School.

In addition, the following awards typically have been available to graduate students in this program:

### U.S. Nuclear Regulatory Commission Fellowships

Available to graduate students interested in working in nuclear engineering, covering stipend and tuition.

### U.S. Department of Energy-Nuclear Science and Engineering Fellowships

Available to graduate students interested in engineering and engineering support related to nuclear technology; stipend plus tuition.

## Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Nuclear Engineering (NUCE) Course List (<https://bulletins.psu.edu/university-course-descriptions/graduate/nuce/>)

## Contact

<b>Campus</b>	University Park
<b>Graduate Program Head</b>	Jon Michael Schwantes
<b>Director of Graduate Studies (DGS) or Professor-in-Charge (PIC)</b>	Dipanjan Pan
<b>Program Contact</b>	Ashley Linn Ammerman 113 Hallowell Building University Park PA 16802 alb5678@psu.edu (814) 865-5940
<b>Program Website</b>	View ( <a href="http://www.nuce.psu.edu">http://www.nuce.psu.edu</a> )
<b>Campus</b>	World Campus
<b>Graduate Program Head</b>	Jon Michael Schwantes
<b>Director of Graduate Studies (DGS) or Professor-in-Charge (PIC)</b>	Dipanjan Pan
<b>Program Contact</b>	Ashley Linn Ammerman 113 Hallowell Building University Park PA 16802 alb5678@psu.edu (814) 865-5940
<b>Program Website</b>	View ( <a href="http://www.nuce.psu.edu">http://www.nuce.psu.edu</a> )