

NUCLEAR ENGINEERING AND ENGINEERING PHYSICS, PHD

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum degree requirements (<https://guide.wisc.edu/graduate/#requirementstext>) and policies (<https://guide.wisc.edu/graduate/#policiestext>), in addition to the program requirements listed below.

MAJOR REQUIREMENTS

MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW–Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement Detail

Minimum Credit Requirement	51 credits approved by the student's faculty advisor
Minimum Residence Credit Requirement	32 credits

Minimum Graduate Coursework Requirement	26 credits must be in graduate-level coursework from nuclear engineering, math, physics, chemistry, computer science, or any other engineering department except E P D. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/).
Overall Graduate GPA Requirement	3.00 GPA required. Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/).
Other Grade Requirements	Grades of D received in any course will not be counted as satisfying degree requirements. These grades will, however, be counted in the graduate GPA. Pass/fail grades are not counted toward degree requirements. A minimum 3.0 GPA is required.
Assessments and Examinations	PhD qualifying examination is required of all students. After acceptance of the student's doctoral plan of study, the student must take an oral preliminary examination. Final oral examination is required at the end of the thesis work.
Language Requirements	No language requirements.
Graduate School Breadth Requirements	All doctoral students are required to complete a doctoral breadth requirement. In consultation with, and approval by, the graduate faculty advisor/department, students should select one of the following options: 1. Option A (External Minor): Fulfillment of this minor requires approval of the doctoral minor program. This minor must be outside of the student's doctoral major program. 2. Option B (Distributed Minor): Fulfillment of this minor requires a minimum of 9 credits, total, from two or more departments selected for their relevance to a particular area of concentration. Courses must be numbered 400 and above, may include NE coursework, but may not overlap with the Research Focus coursework or the Core Area Courses. 3. Option C (Graduate/Professional Certificate): Requires successful completion of a graduate/professional certificate in a program outside of the student's doctoral major program.

REQUIRED COURSES

Unless specified, all courses must be numbered 400 or above in appropriate technical areas. Appropriate technical areas are: Engineering departments (except Engineering and Professional Development), Physics, Math, Statistics, Computer Science, Medical Physics, and Chemistry. Other courses may be deemed appropriate by a student's faculty advisor. (This policy does not apply to courses satisfied by the research focus coursework).

Code	Title	Credits
Lecture and Seminar Coursework ¹		
Complete all requirements (courses used to meet these requirements may overlap):	Nuclear Engineering Courses ²	36

Core Area Course Requirement (4 courses): Students must complete one course in each area; courses must be numbered 400 and above and selected in consultation with faculty advisor. Refer to Core Areas Course List for options.³

Complete minimum 18 credits of appropriate technical coursework numbered 500 and above from any department and approved by faculty advisor⁴

Complete minimum 9 credits of appropriate technical coursework numbered 700 and above from any department and approved by faculty advisor⁴

Complete minimum 24 credits of Research Focus coursework directly related to the student's research (explanation on how courses contribute to research and faculty advisor approval required)⁵

Remaining Credits

Complete any combination of the following: 15

N E 890 Pre-Dissertator's Research

N E 990 Research and Thesis

Additional courses from the Lecture and Seminar Coursework above

Total Credits 51

¹ Graduate School Breadth Requirement (see requirement above) courses may be counted toward the 36 credit Lecture and Seminar Coursework requirement.

² The following courses, or courses with similar material content, must be taken prior to or during the course of study:

- N E 427 Nuclear Instrumentation Laboratory; AND
- N E 428 Nuclear Reactor Laboratory OR N E 526 Laboratory Course in Plasmas; AND
- N E 408 Ionizing Radiation OR N E/MED PHYS 569 Health Physics and Biological Effects.

Students who have taken courses with a similar material content, must contact the NEEP Associate Chair of Graduate Studies for approval of the specific course(s).

³ The four core areas are Fission Reactors, Plasma Physics and Fusion, Materials, and Engineering Mathematics and Computation.

⁴ Research courses such as N E 790 Master's Research and Thesis, N E 890 Pre-Dissertator's Research, N E 990 Research and Thesis, and Independent Study Courses such as N E 699 Advanced Independent Study and N E 999 Advanced Independent Study may not be used to satisfy this requirement.

⁵ Non-technical coursework is not required within the degree. However, with faculty advisor approval, students may choose a maximum of 6 credits of non-technical coursework to satisfy credits within the 24 credits of Research Focus Requirement and/or the Graduate School Breadth Requirement.

Core Areas Course List

These courses are examples that would meet the requirement and are not meant to be a restricted list of possible courses. The candidate is required to complete one course in each of the following areas:

Code	Title	Credits
Fission Reactors		
N E 405	Nuclear Reactor Theory	3
N E 408	Ionizing Radiation	3

N E 411	Nuclear Reactor Engineering	3
N E/MED PHYS 506	Monte Carlo Radiation Transport	3
N E/M E 520	Two-Phase Flow and Heat Transfer	3
N E 550	Advanced Nuclear Power Engineering	3
N E 555	Nuclear Reactor Dynamics	3
N E/M E 565	Power Plant Technology	3
N E/I SY E 574	Methods for Probabilistic Risk Analysis of Nuclear Power Plants	3

Plasma Physics & Fusion

N E/E C E/ PHYSICS 525	Introduction to Plasmas	3
N E/E C E/ PHYSICS 527	Plasma Confinement and Heating	3
N E/E C E 528	Plasma Processing and Technology	3
N E 536	Feasibility of Fusion Power Plants based on Controlled Nuclear Fusion	3

Materials

N E/M S & E 423	Nuclear Engineering Materials	3
N E 541	Radiation Damage in Metals	3
PHYSICS 551	Solid State Physics	3

Engineering Mathematics & Computation

E P/E M A 547	Engineering Analysis I	3
E P/E M A 548	Engineering Analysis II	3
COMP SCI/ MATH 513	Numerical Linear Algebra	3
COMP SCI/ MATH 514	Numerical Analysis	3
MATH 703	Methods of Applied Mathematics 1	3