Department of Engineering Physics

Academic Policies and Procedures for Graduate Work in Nuclear Engineering and Engineering Physics

July 2009

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Introduction

This bulletin details the academic policies and procedures for students working toward the M.S. and Ph.D. degrees in **Nuclear Engineering and Engineering Physics**. The graduate program in **Nuclear Engineering and Engineering Physics** is administered by the **Department of Engineering Physics**. The time schedules refer to those for a full-time student. Reference should also be made to **Information for Graduate Students for Non-Academic Procedures**; this is available in the Department Office (153 ERB).

Students should become familiar with the pertinent material in this bulletin and with the requirements of the Graduate School as given in the **Graduate School Catalog (www.grad.wisc.edu/catalog)**. **It is the student's responsibility to make sure that all requirements are met.**

We welcome you to the University of Wisconsin-Madison and to the Department, and wish you a successful graduate career!

Admission to Graduate Study

For admission to graduate study in Nuclear Engineering and Engineering Physics, an applicant must have a bachelor's degree in engineering or physical science and an undergraduate record that indicates an ability to successfully pursue graduate study. The Graduate School requires a minimum undergraduate grade point average of 3.0 on a 4.0 basis on the equivalent of the last 60 semester hours from the most recent bachelor's degree. In special cases, students with grade point averages lower than 3.0 who meet all the general requirements of the Graduate School may be considered for admission on probation.

It is desirable that the student have the following courses before entering the program:

Course and Semester Credits	Typical Courses
Differential equations, 3 cr	Math 319
Advanced mathematics, 3 cr	Math 321
Nuclear physics, 3 cr	NE (NEEP) 305
Materials science, metallurgy, or solid state physics, 3 cr	MS&E 350 or 351
Heat transfer or fluid mechanics, 3 cr	ChE 320
Mechanics, 3 cr	Phys 311, EMA 202

A student may enter without these courses, but all must be taken prior to receipt of a graduate degree, and none can be counted toward meeting M.S. or Ph.D. requirements. With the approval of the student's adviser, the student may be permitted to meet any of these requirements by independent study followed by an examination.

Provisions for admission on probation, on a Senior-Graduate basis, or as an applicant for more than one master's degree (e.g., simultaneous M.S. degrees in two departments) are given in the Graduate School Catalog.

Admission as a Special Student

The Graduate School will permit admission as a Special Student for students whose academic record is difficult to evaluate, but otherwise shows promise for graduate study. While graduate level work done as a Special Student does not earn Graduate School credit, it may still fulfill departmental course requirements. It can also be used to meet admission requirements and to correct weaknesses in the student's preparation for graduate study. After a satisfactory record as a Special Student, the student can then apply for admission as a regular graduate student. The student is advised to consult the Graduate School guidelines to determine the current policies and regulations.

Grade Policy

The Graduate School requires an average record of B or better in all 300-level or above courses taken as a graduate student regardless of whether the course counts for credit in the NEEP program. The Graduate School reviews each student's progress every semester and will usually refuse continued enrollment after two semesters of below B-average grades unless unusual or extenuating circumstances have prevailed.

The NEEP Program requires that courses in which grades of BC, C, or below are received cannot be counted toward a graduate degree except as follows:

1. Credits of C will be allowed provided they are balanced by twice as many credits of A or by four times as many credits of AB.
2. Credits of BC will be allowed provided they are balanced by twice as many credits of AB or by an equal number of credits of A.

Important Advice
Because of the grade requirements, it may be desirable that

- foreign students coming from an entirely different university system,
- foreign students with inadequate preparation,
- disadvantaged American students with inadequate preparation

enroll for at least the first semester in graduate study as a Special Student. (See Admission to Graduate Study.)

Advising

Each graduate student will be appointed a major professor by the Department Chair upon entering the program. If the student is supported by a research assistantship, this will normally be the professor in charge of the research program. In other cases this will normally be a faculty member with expertise in the student's area of interest. Students desiring to change their major professor should consult with the Department Chair.

Students may have a major professor outside the department if it is appropriate for the student's research area and if the professor is willing to serve in that capacity. In this case, the Department Chair will also appoint a member of the departmental faculty to serve as the student's academic (non-research) advisor.

Limits on Credits per Term

Full-time student status requires the student enroll for a minimum of 8 credits of course work numbered 300 or higher, including research credits, each semester until the student becomes a Ph.D. dissertator. Dissertators must enroll for at least three credits. The normal maximum number of credits is 12, although 13 credits can be taken in special situations with the approval of the Graduate School.

Holders of research assistantships, teaching assistantships, traineeships, or fellowships are required to maintain full-time status each semester. Research assistants are expected to register for at least two credits (3 credits for dissertators) during the summer session. Teaching assistants with summer appointments need not normally be registered during the summer. Fellowship holders should consult the terms for their fellowships. A full-time student is limited to 6 credits during the summer.

Graduate Student Seminar Requirement

In addition to regular attendance of the Engineering Physics Colloquium (held on Tuesdays at 4:00 pm in 106 Engineering Research Building during the academic year), all Nuclear Engineering and Engineering Physics graduate students are expected to attend at least one additional research seminar or research group meeting where they may present their own research in a seminar format. First year graduate students are exempt from giving a presentation (although they may volunteer to give one), but all non-first year graduate students are expected to present on an annual basis.

The goals of the presentation requirement include:

- Provide professional development opportunities for graduate students.
- Improve the oral presentation skills of graduate students.
- Improve the ability of graduate students to "think on their feet."
- Provide an opportunity for graduate students to further understand and explain the context of their research.
- Provide a forum in which conference presentations can be practiced in front of a large technical audience.
- Improve information exchange between research groups.
- Enhance the sense of community among students in the graduate programs within the Department of Engineering Physics.

Explanation of Research and Thesis Credits

NE (NEEP) 790 is for research that is expected to lead to a M.S. thesis, NE (NEEP) 890 is for research where the student has not yet become a dissertator and the research will not be used for a M.S. thesis, and NE (NEEP) 990 is for Ph.D. dissertation research where the student is a dissertator. Credits taken are variable. Students should discuss the appropriate number of credits for a specific semester with their advisor.

Graduate Policy-Related Web Sites

The Graduate School web site (http://www.grad.wisc.edu) has extensive information concerning policies and procedures for graduate students. You are responsible for consulting it and abiding by it.

Other useful web sites are:

Engineering Physics Department	http://www.engr.wisc.edu/ep/
College of Engineering	http://www.engr.wisc.edu

Master of Science Degree

Requirements for the Master of Science Degree

1. The following courses must be taken either prior to, or during the course of study for the M.S. degree:
    a. NE (NEEP) 427
    b. NE (NEEP) 428 or NE (NEEP) 526
    c. Two courses from the following list:
        NE (NEEP) 405, 408, 411, 412, 423, 525, 528, 541, and 562.

2. The candidate must complete during the course of graduate study 24 credits of technical courses approved by his or her advisor. These courses must be consistent with the following requirements:
    a. At least 12 credits of NE (NEEP) courses at the 400 level or above. The Department may relax the 12-credit requirement in unusual cases.
    b. The remaining 12 credits (also numbered 400 or higher) must be in appropriate technical areas such as physical sciences, radiology, or suitable biological studies, but not humanities or social studies.
    c. At least 6 credits numbered 500 and higher if a thesis is submitted, or at least 9 credits numbered 500 and higher if a thesis is not submitted.

3. The candidate must demonstrate a knowledge of shielding and radiation protection such as is taught in NE (NEEP) 408 or NE (NEEP) 569. The requirement can also be satisfied by examination.

4. The courses taken as a graduate student must satisfy the departmental grade policy. (see page 3)

5. The candidate must pass the Master's Oral Examination.

6. The candidate must satisfy all Graduate School requirements, including grade point average requirements.

Transfer of Credits

Students may transfer up to 6 credits of graduate work taken at another institution if they meet departmental M.S. requirements.

Master's Thesis

1. A Master's thesis is not required. It is usually recommended for students intending to finish their graduate study with the Master's degree. Students should consult their advisor about the desirability of submitting a Master's thesis.

2. A maximum of 8 credits may be granted for a master's thesis. Credit for Master's research courses (NEEP 790) will be granted toward meeting the M.S. requirements only when a formal M.S. thesis is submitted.

3. The Department requires that the M.S. thesis be submitted to the Memorial Library. It is suggested that students consult Memorial Library rules and regulations early as plans are made for thesis completion.

Master's Oral Examination

Candidates must pass an oral exam administered by three faculty members, selected by the student's advisor. Students who have passed the oral part of the Ph.D. Qualifying Exam will be deemed to have passed the Master's oral exam, unless they have written an M.S. thesis. The use of thesis credits as part of the 24 credit M.S. requirement always requires a defense.

The oral exam will be on the thesis if the student submitted one; otherwise, it will be on coursework taken by the student. The student will have two chances to pass the oral exam, with at least one month between the two exams. Students should contact their adviser with respect to the timing of the exam and the composition of the committee.

Application Procedures for the Master's Degree

Below is a summary of some of the Graduate School requirements. This is not a complete list. Please review Graduate School Catalog and Handbook for full details, or contact the Graduate School office.

To receive a master's degree, contact your program office at the beginning of the semester in which you intend to graduate. Your program office will check that you have met department requirements and will request a warrant on your behalf from the Graduate School. You need to be enrolled for a minimum of two graduate-level credits (300 or above) for a grade (audits and pass/fail do not satisfy this requirement) during the semester in which you intend to graduate. For more information and for deadlines see *Expecting your Master's Degree? Procedures to Help,* found at the website http://grad.wisc.edu/education/completedegree/mdegree.html.

If you have a prior Master's degree from this University, or are expecting to complete two separate degrees during the same semester, you must submit along with your degree application a letter from each department that includes an official (signed by advisor or Department Chair) list of courses used for each degree. Your application is not complete until the two lists are received.

You must have a graduate GPA of at least 3.0/4.0 and no incomplete or progress grades on your record. (Progress grades in NEEP 890 are allowed.).

A signed Warrant is a document needed to graduate. The Warrant is issued by the Graduate School for one semester only. The Warrant is signed by your academic advisor and the Department Chair indicating that all degree requirements have been met. Warrants can be issued after all other incomplete and progress grades are cleared.

If the Department has signed and returned your Warrant to the Graduate School, and you subsequently receive an incomplete or progress grade, you will graduate during the semester in which your grade is cleared.

B.S. Nuclear Engineering / M.S. Nuclear Engineering and Engineering Physics Dual Degree Program

Qualified undergraduates may earn a B.S. degree in Nuclear Engineering and a M.S. degree in Nuclear Engineering and Engineering Physics in 5 years with a total of 148 credits, following a carefully chosen plan of study. Both degrees are granted simultaneously when both the B.S. and M.S. degree requirements are met. You will be eligible for consideration for a research assistantship during the fifth year.

Requirements for Admission

1. Majoring in **Nuclear Engineering** undergraduate program**.**
2. Grade point average of 3.0 or better

Application Procedure

1. Toward the end of your junior year submit a letter of application to the Department Chair.
    a. Include with this letter a schedule plan for the courses you will take during the fourth and fifth years; this plan should be worked out with, and approved by, your advisor. An example is attached. See Appendix A.
    b. Designate which courses to be taken during the last two years are to be counted for undergraduate credit and for graduate credit. Up to 4 credits may be counted for both undergraduate and graduate credit (NE (NEEP) 427/428 or their equivalent).

    If admitted by the department to the Dual Degree program, a notation of admission will be placed on your transcript. Your classification will remain NE4 for your senior year.
2. During the second semester of the senior year, apply for admission to the Graduate School. If admitted, your classification will be changed to E5 and you will pay graduate fees for the final year.
3. If you drop out of the Dual Degree program, your classification will be changed back to NE4 and the B.S. degree will be granted when all requirements are met.

Program Requirements

1. The usual requirements for both the B.S.-NE and M.S.-NEEP degrees apply. See the undergraduate and graduate advising materials for a description of the requirements.
2. The total number of credits must be at least 148. Up to 4 credits may be used for meeting both the undergraduate and graduate degree requirements.
3. Changes in your program must be approved by your advisor and a revised program plan submitted to the department prior to deviating from the earlier program plan.

Doctor of Philosophy Degree

Course Requirements

1. All students must fulfill the coursework requirements for the M.S. degree whether receiving the M.S. degree or going directly to the Ph.D. Students should consult with their advisers as to whether coursework taken elsewhere will fulfill some or all of the requirements.

2. The candidate is required to complete one course in each of the following areas:
   Fission Reactors (e.g., NE (NEEP) 405, 408, 411, 506, 512, 520, 550,)
   Plasma Physics & Fusion (e.g., NE (NEEP) 525, 527, 528, 536)
   Materials (e.g., NE (NEEP) 423, 541, 562, Physics 551)
   Engineering Mathematics & Computation (e.g., NE (NEEP) 547, 548, 602 (Comp. Eng'r))

   The courses listed in parentheses are examples of courses that will meet this requirement, and are not meant to be a restricted list of possible courses. These courses must be taken as a graduate student and be at the 400 level or above. If a student has taken one or more of the courses in some area as an undergraduate student, he or she would need to take another course in the same area. Students possessing substantial background in any of the four areas may request to be excused from the requirement to take a course in that area either by petition to the Department Chair or in the student's Doctoral Plan.

3. The candidate must take three 700 level courses as part of their doctoral plan. Doctoral students may take additional advanced courses as appropriate to their particular field of specialization.

4. The candidate must satisfy the Ph.D. Technical Minor requirement.

5. The candidate must satisfy the Ph.D. Non-Technical Minor requirement.

Ph.D. Technical Minor

The minor field of study must be chosen in consultation with the major professor. **The *Ph.D. Minor Agreement Form* must be on file with the Engineering Physics Office halfway through the minor program.** Forms are available from Student Services, Room 144 ERB.

There are two minor options available:

Minor Option A:
Students minor in a single department and satisfy the minor requirements of that department. This requires a minimum of 10 credits. Individual departments will have their own course requirements.

Minor Option B (Distributed Minor):
This option requires a minimum of 10 credits in two or more departments outside the major, in related courses selected for their relevance to a particular area of concentration. No course below the 400 level may be used to satisfy this requirement.

Ph.D. Qualifying Examination

When should the qualifying exam be taken?
The exam should be first taken no later than completion of the M.S. requirements, or the beginning of the fourth semester of graduate study, whichever comes first. Students entering the program with a Master's degree in EM or NEEP from another institution, and taking the qualifying exam in that same major, must take the exam by the beginning of their third semester.

When is the qualifying exam offered?
The examination will usually be given each fall and spring semester within the first week of classes. All eligible students will receive notice each time the exam is given. It is the student's responsibility to consult with their advisor to determine whether to take the exam at that time and the specific exams to be taken.

What is required to pass the qualifying exam?
Students are given two chances to pass the set of qualifying exams. All exams are to be graded on a pass/fail basis. If an individual exam is failed, it may be taken a second time. An exam that is passed does not have to be repeated, independent of student performance on the other exams.

What are the details of the qualifying exams offered?
The student with their advisor's approval will sign up to take 3 two-hour closed book written exams from a possible list of 7 exams plus an oral exam.

These 7 written exams are planned to be in the following topic areas (resources detailed below):

- Mathematics (Math 319, 321 and 340 or similar topics in EMA/NE 547)
- Classical Physics (Physics 311 and 322)
- Modern Physics (Physics 241 and NE 305)
- Elementary Mechanics and Materials (EMA 202, 303 and MS&E 350)
- Engineering Mechanics (EMA 506, 542, 545)
- Momentum and Heat Transfer (ChE 320 or similar topics in ME 363, 364)
- Reactor Analysis and Radiation Protection (NE 405, 408, 427)

Can there be special extenuating circumstances?
In a few cases it may be unreasonable to retake the exam the next time it is given; in this case the student should petition the Department for permission to defer the reexamination. Such a petition should be by letter and must be received by the Department Chair within one month after learning the outcome of the first examination.

On rare occasion, a set of circumstances may arise where a candidate fails the qualifying examination twice, yet the Department faculty believes the performance is not representative of the candidate. When the Department faculty believes that a candidate has outstanding and highly unusual ability, it will retain the prerogative of granting a third opportunity to take the exam in whatever form the faculty deems appropriate.

What is the structure of the oral exam?
An oral exam will also be required by all students taking the qualifying exam and will be graded on a pass/fail basis. The oral exams will be scheduled immediately after the written exams. Each student will be given a set of three questions prior to the oral exam that will be used in the oral exam as a beginning point for the impromptu oral questions. The subject matter of the questions will be based on the written exams chosen by the student and on their specialty area (i.e., engineering mechanics, plasma physics or nuclear engineering). The oral exam committee will consist of 3 faculty including the student's advisor, one additional member from the student's same research area, and one member from a different research area. The oral exam will last approximately one hour.

Description of Qualifying Examination Written Exams

Listed below are topics, courses and texts representative of material to be covered on the respective examinations. Prior exams (without solutions) are available in the Department office.

A. Engineering Mathematics (2 hours, typically 4 out of 6 questions):
- Ordinary Differential Equations (Math 319)
  - Boyce & DiPrima, *Elementary Differential Equations & Boundary Value Problems*
- Applied Mathematical Analysis (Math 321)
  - Greenberg, *Advanced Engineering Mathematics*
  - Hildebrand, *Advanced Calculus for Applications*
- Linear Algebra (Math 340)
  - Lay, *Linear Algebra and Its Applications*

B. Classical Physics (2 hours, typically 4 out of 6 questions):
- Mechanics (Physics 311)
  - Marion and Thornton, *Classical Dynamics of Particles & Systems*
- Intermediate Electricity and Magnetism (Physics 322)
  - Griffiths, *Introduction to Electrodynamics*
  - Lorrain & Corson, *Electromagnetic Fields and Waves*

C. **Modern Physics** (2 hours, typically 4 out of 6 questions):
- Fundamentals of Modern Physics (Physics 241)
  - Tipler, *Elementary Modern Physics*
- Atomic and Nuclear Physics (NEEP 305)
  - Krane, *Introductory Nuclear Physics*

D. **Elementary Mechanics and Materials** (2 hours, typically 4 out of 6 questions):
- Elementary Dynamics (EMA 202)
  - Hibbeler, *Engineering Mechanics-Dynamics*
- Mechanics of Materials (EMA 303)
  - Gere, *Mechanics of Materials*
- Fundamentals of Materials Science (MSAE 350 or 351)
  - Van Vlack, *Elements of Materials Science and Engineering*
  - Callister, *Materials Science and Engineering, An Introduction*

E. **Engineering Mechanics** (2 hours, typically 4 out of 6 questions):
- Advanced Mechanics of Materials (EMA 506)
  - Cook & Young, *Advanced Mechanics of Materials*
- Advanced Dynamics (EMA 542)
  - Ginsberg, *Advanced Engineering Dynamics*
- Mechanical Vibrations (EMA 545)
  - Inman, *Engineering Vibration*
  - Thomson, *Theory of Vibrations with Applications*

F. **Momentum and Heat Transfer** (2 hours, typically 4 out of 6 questions):
- Transport Phenomena (ChE 320)
  - Bird, Stewart and Lightfoot, *Transport Phenomena* ***OR***
- Elementary Fluid Dynamics (ME 363)
  - Fox & McDonald, *Introduction to Fluid Mechanics*
- Heat Transfer (ME 364)
  - Incropera & DeWitt, *Fundamentals of Heat Transfer*

G. **Reactor Analysis and Radiation Protection** (2 hours, typically 4 out of 6 questions):
Nuclear Reactor Theory (NE 405)
Duderstadt and Hamilton, *Nuclear Reactor Analysis*
Ionizing Radiation (NE 408)
Lamarsh, *Introduction to Nuclear Engineering*
Nuclear Instrumentation (NE 427)
Knoll, *Radiation Detection and Measurement*

Non-Technical Minor

Ph.D. candidates must complete one of the following four study options prior to receiving dissertator status. As this is a formal Department requirement, the student should select a Non-Technical Minor early in the program, and must complete it by the time of the Preliminary Examination. The Non-Technical Minor must be planned with the help of the candidate's adviser and must be approved by the Department Non-Technical Minor Adviser except for Study Option IV which must be approved by the Department faculty also. A *Non-Technical Minor Approval Form* is available in the Student Services office (144 ERB) and must be filed prior to submission of the doctoral plan form. Courses below the 400 level may be used as a part of the Non-Technical Minor.

Study Option I: Technology-Society Interaction Coursework. This option is intended to increase the student's awareness of the possible effects of technology on society and of the professional responsibilities of engineers and scientists in understanding such side effects. These effects could, for example, involve the influence of engineering on life prolongation, on increasing or reducing problems of the ghetto, or on environmental and ecological systems.

Suggested courses for fulfilling **Option I** include the following:

CEE 320	Environmental Engineering
CEE 423/ ME 466	Air Pollution--Effects, Measurements and Control
Econ 474	Economic Problems of Developing Areas
Geog 305	Introduction to the City
Geog 505	Urban Spatial Patterns & Theories
Geol 410	Minerals as a Public Problem
History 402	American Urban History Since 1870
Hist Sci 327	Science, Technology, and Society
Hist Sci 331	Science, Medicine and Religion
ME 477	Energy Utilization Technology

Study Option II: Humanistic Society Studies Coursework. The basic objectives of this option are to help prepare the student to bridge the gap between C.P. Snow's "Two Cultures." Snow's 1959 lecture thesis was that the breakdown of communication between the "two cultures" of modern society - the sciences and the humanities - was a major hindrance to solving the world's problems. Study might be designed to give a greater appreciation of the arts such as the classics, music, or painting, or it might be designed, for example, as preparation for translating technical information to the non-technical public.

Suggested areas of study to fulfill **Option II** include Anthropology, Area Studies, Art, Art History, Classics, Comparative Literature, Contemporary Trends, English (literature), Foreign Languages (literature), Social Work, Sociology, and Speech.

Under either **Option I or II**, the student must take 6 credits of coursework. The courses must be approved by the student's adviser and the non-technical minor adviser, and the 6 credits should be concentrated in one topical area. Grades in these courses need not meet the Departmental Grade Policy. However, note that all grades in 300 level or above courses (including grades for Non-Technical Minor courses) are calculated in the Graduate School minimum 3.0 graduation requirement. Upon completion of the courses, the student will either: (a) prepare a written report of approximately ten pages (double space, typewritten) or (b) present a 30-minute oral report to be followed by a question and answer period. Reports should be of a critical nature and not merely a course summary. Written reports will be reviewed by two faculty members to be appointed by the Department Chairman, and oral reports will be reported to at least three faculty members. Interested students are encouraged to attend the presentation of oral reports.

Study Option III: Foreign Culture Coursework. This option is intended for the student who desires to live and work in a foreign nation or work with people of a foreign culture. Examples include studies of the history of a foreign nation, of the political stability of a region of the world, of the culture of a particular group within a nation, or of the spoken language of a foreign nation.

For Option III the student must take six credits of courses under all of the same conditions and requirements as for Option I and II unless choosing language study. For the latter case, no reports are required but the student must attain a grade of C or better in all courses. If the student has previous knowledge of a language, it is required that either courses beyond the introductory level will be elected or that another language will be elected.

Study Option IV: Technology-Society Interactions Experience. There are many possible technology-society interactions that might be more educational and meaningful for the student as an actual experience than coursework. For example, the student might run for and be elected to a position of alderperson in the city government. Consequently, this option allows the student to pursue a particular aspect of the interaction using his own time and resources.

Study Option IV activity must be planned with the student's adviser and be approved by the faculty. The effort required should be equivalent to 6 credits of coursework. Upon completion of this program, the student will prepare a written or oral report as in Options I and II.

Note: Foreign students from countries in which English is not the native tongue have inherently fulfilled these non-technical study goals and are exempt from these formal requirements.

Doctoral Plan of Study

The Department will formally accept the student as a candidate for the Ph.D. after the passage of the Qualifying Examination and upon approval of a doctoral plan of study showing the intended courses of study. The format to be used for this application is given in Appendix B. The Departmental faculty will review the student's entire academic history. It will act on the application based on its collective knowledge of the student's performance in and out of formal coursework. Factors which will be considered include: (a) whether the student would likely profit from further, formal academic study, and (b) whether the student meets the high academic standards and the standards of intellectual integrity expected of a Ph.D. holder from the University of Wisconsin. This is a decision of the Department as a whole, and, while the advice of the student's major professor is solicited, the major professor does not make the decision alone. The student is expected to discuss the doctoral plan in detail with and receive approval of their major professor in order to develop a coherent academic plan of doctoral study.

Approval of the student's proposed course of study will automatically indicate acceptance by the Department as a Ph.D. candidate, and the student will be advised in writing. Attention is called to the fact that formal acceptance as a candidate, rather than passage of the Qualifying Examination, ordinarily constitutes the major step in progress towards the Ph.D.

To assure that a coherent program is planned, the student must submit the Doctoral Plan of Study one month before the end of the semester following the one in which the Qualifying Exam is passed.

If a distributed Technical Minor is proposed, acceptance as a Ph.D. candidate constitutes Departmental approval of that Technical Minor. If it becomes necessary to modify the student's proposed course of study after it has been approved, it is the student's responsibility to bring the matter to the attention of the faculty in writing.

Note: The Graduate School considers an applicant formally admitted to candidacy for the Ph.D. degree when the student has:
(a) passed the comprehensive Preliminary Examination in the major field,
(b) obtained approval of the proposed technical minor requirement, and
(c) presented the title or special field of the proposed thesis, approved by the major professor.

Foreign Language Requirement

There is no foreign language requirement for the Ph.D. program. Students should note the opportunity for foreign language or foreign culture study under the Non-Technical Minor.

Ph.D. Preliminary Examination

After acceptance of the student's Doctoral Plan of Study, the student must take an oral preliminary examination. **Students are expected to pass the Ph.D. Preliminary Examination no later than the end of the third year of graduate studies, or by the end of the second regular semester following the one in which the Ph.D. Qualifying Examination was passed, whichever is later.**

In preparation for this examination, the student shall submit a written thesis proposal containing a discussion of the thesis problem, a survey of pertinent literature, an evaluation of the importance of the problem, an outline of the proposed method of solving the problem, drawings of any equipment to be constructed, a cost estimate, and any preliminary results obtained. The student will then defend the thesis proposal in an oral Preliminary Examination. The Examination Committee will normally be the same as selected for the Final Oral Examination. It will include at least one member from outside the departmental faculty (EP), and it will be chosen to make a critical evaluation of the proposed thesis. The candidate must apply for a warrant from the Graduate School through the Department office at least three weeks prior to the exam.

Should the candidate not pass the preliminary examination, the student is granted a second opportunity to be held within six months of the first examination.

Dissertator Status

All Ph.D. candidates who passed their Preliminary Examinations and completed the major as well as the minor requirements can be designated **dissertators**. Dissertators may register for as few as three credits. (The dissertator fee is substantially lower than the usual cost of the 8-credit load.) Dissertators normally enroll in thesis and research courses (NE (NEEP) 990), but with the approval of their advisors are permitted to substitute three credits of any other graduate level courses; additional credits are permitted at the same dissertator per-credit rate. Dissertators should register **each** semester until the Ph.D. thesis is filed. **If the student fails to do so, a Ph.D. Dissertation and Degree Completion Fee equal to 12 times the current dissertator per-credit rate is required.**

Final Oral Examination

An Oral Examination on the findings of the Ph.D. research is required at the end of the thesis work. This thesis defense is made before a committee of five current faculty members, who have had access to a copy of the thesis for 10 days prior to the Oral Examination. It is advisable to choose this committee as close to that of the Preliminary Examination Committee as practical. The candidate must apply for a warrant from the Graduate School through the Department office at least three weeks prior to the exam.

This examination shall be publicly announced at least one week prior to the examination date. Faculty and students are invited to attend.

Thesis

The thesis must be the candidate's own work; it reports on the original research carried out by the student for the Ph.D. degree. It may be the result of research enterprises in which others have collaborated, but in such cases the candidate is required to present a substantial portion which represents the candidate's own contribution.

The total cost and preparation of the thesis is the responsibility of the student. Detailed instructions for thesis preparation are available from the Graduate School Office in Bascom Hall, and on the Graduate School webpage, http://www.grad.wisc.edu.

Library Copy: must meet the specifications of the Graduate School. Guidelines are available from the Graduate School in Bascom Hall.

Department and Major Professor Copies: should be bound in durable black Buckram binding (see Grimm Book Bindery at www.grimmbindery.com) with hard cover. The student's name, degree and year of graduation should be printed in bold gold letters on the book spine. The front and back covers should remain blank.

Industrial/Research Sponsor Copy: The major professor will determine if additional copies are needed and advise the student as to the specifications of the copy.

Criteria for Satisfactory Progress

It is important that graduate students make satisfactory progress in their program of study. One way of measuring the student's progress is his or her schedule for completing various requirements for the Ph.D. degree. The relevant deadlines are listed below. **Students not meeting these deadlines are considered to not be making satisfactory progress and may become ineligible for financial support and/or be dropped from the program.**

1. The Qualifying Examination must be taken no later than completion of the M.S. requirements, or the beginning of the fourth semester of graduate study, whichever comes first. Students entering the program with a Master's degree in EMA, EP or NE from another institution must take the exam by the beginning of their third semester.

2. The Graduate School Ph.D. Minor Agreement Form must be on file with the Department of Engineering Physics halfway through the minor program.

3. Students are expected to submit the Doctoral Plan of Study one month before the end of the semester following the one in which the Qualifying Exam is passed.

4. Students are expected to schedule and pass the Ph.D. Preliminary Examination no later than the end of the third year of graduate studies, or by the end of the second regular semester following the one in which the Ph.D. Qualifying Examination was passed, whichever is later.

5. A candidate who fails to take the Final Oral Examination and deposit the dissertation in the Memorial Library within 5 years after passing the Preliminary Examination must take another Preliminary Examination.

Minor in Nuclear Engineering and Engineering Physics

For students in other departments seeking a minor in **Nuclear Engineering and Engineering Physics**, the following requirements apply:

1. A student who has earned an M.S. degree in **Nuclear Engineering and Engineering Physics** will be considered to have fulfilled the minor requirements.

2. A minimum of 4 NE (NEEP) courses, 400 level or above, are required for the minor. These are decided in consultation with the student's advisor.

   a. All courses used for the minor must be 400 level or above and taken after the bachelor's degree.
   b. Ordinarily only one course (maximum of 3 credits) of independent study is allowed (699, 999).
   c. Research and thesis courses may not be used for the minor.
   d. No more than 5 credits completed 5 or more years prior to admission to the Ph.D. major may be used.
   e. Courses taken 10 or more years ago may not be used.
   f. Courses taken pass-fail or for audit may not be used.
   g. Courses with grades of S given in courses graded on a credit/no credit basis are acceptable.

3. A GPA of 3.0 must be maintained for the minor.

4. A maximum of 6 credits may be transferred from other institutions to satisfy the minor requirements.

5. The minor program must be approved by the Minor Professor, appointed by the department chair.

Departmental Office Staff

Name	Title	Office	Phone	E-mail address
Michael Corradini	Chair	151 ERB	263-1648	corradini@engr.wisc.edu
Dianne Francis	Chair's Assistant	153 ERB	263-1646	dfrancis@engr.wisc.edu
Betsy Wood	Student Records	144 ERB	263-7038	bwood@engr.wisc.edu
Mark Swandby	Administrator	146 ERB	263-1647	swandby@engr.wisc.edu
Nancy Griego	Human Resources	145 ERB	263-5966	griego@engr.wisc.edu
Jennifer Haukohl	Financial Records	103 ERB	262-5723	haukohl@engr.wisc.edu
Joan Welc-LePain	Research Administrator	533 ERB	890-1877	jlepain@engr.wisc.edu
John Murphy	Researcher	147 ERB	265-4186	jmurphy@engr.wisc.edu

Reactor Lab Staff

Robert Agasie	Reactor Director	1209 ME	262-3392	agasie@engr.wisc.edu
Michelle Blanchard	Reactor Supervisor	141 ME	262-3392	mblanchard@engr.wisc.edu
Kevin Austin	Reactor Research Mgr.	101 ME	262-3392	kaustin@engr.wisc.edu
Corey Edwards	Reactor Inst Tech	5 ME	890-1924	csedwards@engr.wisc.edu

Engineering Physics Faculty

The Engineering Physics department has a faculty of 23 professors, and several lecturers, adjunct and emeritus professors. Some are primarily associated with the Engineering Mechanics Program and some with the Nuclear Engineering and Engineering Physics Program.

Name	Title	Office	Phone	E-mail
Matthew S. Allen	Assistant Professor	535 ERB	890-1619	msallen@engr.wisc.edu
Todd R. Allen	Assistant Professor	529 ERB	265-4083	allen@engr.wisc.edu
Vicki Bier	Professor (also IE/GNI)	3234 ME	262-2064	bier@engr.wisc.edu
Joseph Bisognano	Professor (Dir SRC)	103 SRC	877-2163	jbisognano@src.wisc.edu
James P. Blanchard	Professor	143 ERB	263-0391	blanchard@engr.wisc.edu
Riccardo Bonazza	Professor	537 ERB	265-2337	bonazza@engr.wisc.edu
Michael Corradini	Professor (also ME/IES)	151 ERB	263-1648	corradini@engr.wisc.edu
Wendy Crone	Associate Professor	543 ERB	262-8384	crone@engr.wisc.edu
Walter J. Drugan	Professor	527 ERB	262-4572	drugan@engr.wisc.edu
Raymond J. Fonck	Professor	341 ERB	263-7799	fonck@engr.wisc.edu
Chris C. Hegna	Professor	521 ERB	263-0810	hegna@engr.wisc.edu
Douglass Henderson	Professor	411 ERB	263-0808	henderson@engr.wisc.edu
Noah Hershkowitz	Professor	337 ERB	263-4970	hershkowitz@engr.wisc.edu
Daniel C. Kammer	Professor	539 ERB	262-5724	kammer@engr.wisc.edu
Gerald L. Kulcinski	Professor (Assoc Dean)	2630b EH	263-0601	kulcinski@engr.wisc.edu
Roderick S. Lakes	Professor	541 ERB	265-8697	lakes@engr.wisc.edu
Gregory A. Moses	Professor	407 ERB	265-6567	moses@engr.wisc.edu
John M. Pfotenhauer	Professor (also ME)	1329 ERB	263-4082	pfot@engr.wisc.edu
Michael E. Plesha	Professor	525 ERB	262-5741	plesha@engr.wisc.edu
Leslie Smith	Professor (also Math)	505 VV	263-3057	lsmith@math.wisc.edu
Carl R. Sovinec	Associate Professor	519 ERB	263-5525	sovinec@engr.wisc.edu
Francesco Volpe	Assistant Professor	331 ERB	262-4854	fvolpe@wisc.edu
Fabian Waleffe	Professor (also Math)	819 VV	262-3269	waleffe@math.wisc.edu
Paul Wilson	Associate Professor	419 ERB	263-0807	wilsonp@engr.wisc.edu
Robert J. Witt	Associate Professor	531 ERB	263-2760	witt@engr.wisc.edu

APPENDIX A *SAMPLE*

B.S. NE/M.S. NEEP Dual Degree Program Plan

Course		Undergrad Credit	Graduate Credit
	Senior Year - Fall Semester		
NE (NEEP) 411	Nuclear Reactor Engineering	3	
NE (NEEP) 427	Nuclear Instrum. Lab.	2	2
	Liberal Studies Electives	4	
	Nuclear Engineering Electives	6	
	Senior Year - Spring Semester		
EPD 397	Technical Writing	3	
NE (NEEP) 428	Nuclear Reactor Lab.	2	2
NE (NEEP) 571	Econ. & Environ. Aspects of Nuclear Energy	3	
NE (NEEP) 565	Nuclear Engineering Electives	3	
	Liberal Studies Electives	3	
	Senior Year - Summer Session		
NE (NEEP) 412	Nuclear Reactor Design	5	
	Fifth Year - Fall Semester		
NE (NEEP) 547	Engineering Analysis I		3
NE (NEEP) 550	Adv. Nuclear Power Engineering		3
NE (NEEP) 602	Applied Computational Engineering		3
	Fifth Year - Spring Semester		
NE (NEEP) 541	Radiation Damage		3
NE (NEEP) 548	Engineering Analysis II		3
NE (NEEP) 520	Multiphase Flow		3
NE (NEEP) 699	Independent Study		2
Total Credits		34	24

Undergrad credits prior to senior year:	95
Undergrad credits 4th and 5th years	34
Total undergrad credits:	128
Total graduate credits:	24
Credits used for both:	(4)
Total credits:	148

Approved: _____ _____

Advisor's signature Department Chair

APPENDIX B *SAMPLE*

April 1, 2007

To: M.L. Corradini, Department Chair
From: John Q. Public
Subject: **NEEP Doctoral Plan**

I request approval of the following doctoral plan and formal acceptance as a Ph.D. candidate in the NEEP program.

A. TECHNICAL COURSEWORK IN GRADUATE SCHOOL (already taken or to be taken)

Course #	Course Title	Credits	Date	Grade	Count for M.S.	Count for Tech. Min.
NEEP 408	Ionizing Radiation	3	F/00	A	Y	
NEEP 427	Nuclear Instrum Lab	2	F/00	AB	Y	
ECE 430	Random Signal Analysis 3	F/91	A		Y	
NEEP 525	Introduction to Plasmas 3	F/90	A	Y		
NEEP 526	Lab Course in Plasmas	3	S/01	A	Y	
NEEP 527	Plasma Confinement & Heating	3	F01	A	Y	
Phys 546	Lasers	2	S/01	A	Y	Y
NEEP 602	Special Topics (Comput. Eng'r)	1	S/03	audit		
Phys 623	Electronic Aids to Measurement	4	F/00	A	Y	Y
Phys 625	Applied Optics	4	S/02	A		Y
NEEP 724	Waves & Instabilities in Plasmas	3	S/01	A	Y	
NEEP 725	Plasma Kinetic Th & Rad Proc	3	F/01	A		
NEEP 741	Interaction of Radiation with Matter I	3	F/00	A	Y	
NEEP 742	Interaction of Radiation with Matter II	3	S/02	B		
Phys 805	Topics in Fluid and Plasma Turbulence	3	S/03	--		
	Total Credits	42				

B. PROPOSED AREA OF THESIS RESEARCH

I propose to do my thesis research on plasma diagnostics on TFTR. Professor Plasma will be my thesis advisor.

C. BREADTH REQUIREMENT

List one course in each area. The courses should also be shown in Section A.

Area	Course No.	Course Title
Fission	NEEP 408	Ionizing Radiation
Plasma Physics & Fusion	NEEP 527	Plasma Heating & Confinement
Materials	NEEP 423	Nuclear Materials
Eng'r Math & Computation	NEEP 541	Advanced Engineering Math I

D. TECHNICAL MINOR

I chose the distributed minor option; see courses listed above.

E. NON-TECHNICAL MINOR

My non-technical minor will be in Study Option III. The courses I have taken to complete this minor are:

Course No. and Title	Credits	Date	Grade
East Asian 123 Elementary Japanese I	3	Spring 2002	A
East Asian 124 Elementary Japanese II	3	Fall 2002	A

Prof. Michael Corradini, the Department Non-Technical Minor Advisor, approved this minor on Jan. 31, 2005.

F. EXAMINING COMMITTEE
My advisor, Professor Plasma, recommends the following five staff people constitute my Preliminary Examination Committee and, if practical, my Final Oral Committee:

_____
_____
_____
_____
_____

I have obtained the consent of each of the faculty members listed to serve on these committees. At least one of these members is from outside the EP Department.

G. MASTER'S THESIS
I did not perform a Master's thesis. (If applicable, give title, major professor, institution.)

H. Ph.D. QUALIFYING EXAM
I passed the Ph.D. qualifying exam on March 17, 2005.

I. DEGREES HELD
I have previously received the following degree:
Bachelor of Science in Applied Physics, 1999, Michigan Technological University

J. PERTINENT UNDERGRADUATE COURSES
I have taken the following undergraduate courses at Michigan Tech. which are particularly significant in my present plans:

Course No. and Title	Credits	Date	Grade
Math 415 Fourier Series Applications	3	Spring 1999	A
Math 414 Ordinary Diff Equations	3	Winter 1998	A
Math 412 Intro to Complex Analysis	3	Fall 1998	A
Math 250 Calc & Anal Geom 4 (lin alg)	3	Fall 1997	A
Mech Eng 328 Heat Transfer I	3	Spring 1999	A
Eng Mech 332 Fluid Mechanics I	3	Winter 1999	A
Physics 444 Intro to Nuclear Physics	3	Winter-Spring 1999	A
Physics 420-422, Quantum Mech I,II,III	3	1998-1999	A
Physics 360 Geometrical & Phys Optics	3	Spring 1999	A
Physics 345 Thermo & Kinetic Theory	3	Spring 1998	A
Physics 337 Electronics	3	Winter 1998	A
Physics 316,317 Electrical	3	Fall 1998	A

Taken as a graduate student at UW to satisfy admission requirements:

MS&E 351 Struct & prop Rel'ns of Soli	3	Spring 2001	A

Respectfully submitted:

_____
(signature)

I have checked and approved this statement:

_____ (Major Professor)
(signature of Major Professor)

Approved by the Department:

_____ _____
(signature of department chair) (date)