

# ***Nuclear Engineering***

## ***A Guide for Undergraduate Majors***

***July 2009***

**This guide applies to students entering the program after July 2009. Students admitted prior to July 2009 should continue to follow the Undergraduate Student guide in effect when they entered the program. They may petition the department to select features of the new curriculum.**

administered by the

### **Department of Engineering Physics**

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# Introduction

The **Nuclear Engineering** Program is administered by the **Department of Engineering Physics**. The Department Office is in room 153 of the Engineering Research Building (ERB). The Department Chair's office is also in room 153 ERB. The department also administers the **Engineering Mechanics (EM)** and the **Engineering Physics (EP)** undergraduate programs.

This guide is intended to provide **Nuclear Engineering** undergraduate students with information that will facilitate their studies at the University of Wisconsin-Madison. In addition to this guide, you should consult the **Undergraduate Catalog** (<http://www.pubs.wisc.edu/ug/>) for regulations and course descriptions in engineering.

The **Department of Engineering Physics** website is at <http://www.engr.wisc.edu/ep/>. From there you can follow links to specific sections for **NE** students. The **College of Engineering (COE)** web site (<http://www.engr.wisc.edu>) also provides information for engineering students.

We welcome you to the **Nuclear Engineering** Program, and wish you a successful undergraduate career!

## Career Opportunities in Nuclear Engineering

Nuclear engineering is defined as the application of nuclear and radiation processes in technology. An important application is the generation of electricity using nuclear reactors. Another important application is in medicine, where radiation and radioisotopes are used to diagnose and treat illness. Nuclear engineering offers students an important opportunity to help meet the energy needs of our society and to contribute to the improvement of health through medical applications. Further, because the nuclear engineering curriculum is very rich in engineering physics, graduates are prepared to work in a number of technical activities outside the nuclear engineering field.

Nuclear energy, both from fission and fusion, offers a promising approach to meeting the nation's energy needs--an approach that may preserve jobs, raise the standard of living of Americans, and alleviate the alarming depletion of natural resources including natural gas, petroleum, and coal. Even more important, nuclear energy offers the only practical, environmentally benign approach to generating electricity on a large scale because it releases no harmful SO<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub>, or particulate matter into the atmosphere. Nuclear energy has played, and continues to play, an important role in space exploration. Nuclear engineering has enabled the use of isotopic power supplies in deep space probes like the Cassini mission, and may eventually be used to design fission or fusion-based systems for more demanding missions.

Since the discovery of fission 60 years ago, electricity is being produced commercially in a several hundred-billion-dollar industry. Applications of radioactive tracers have been made in medicine, science, and industry. Radiation from particle accelerators and materials made radioactive in nuclear reactors are used worldwide to treat cancer and other diseases, to provide the power for satellite instrumentation, to preserve food, to sterilize medical supplies, to search for flaws in welds and piping, and to polymerize chemicals. In addition, there is evidence from plasma research laboratories that breakthroughs are imminent in the field of controlled thermonuclear fusion.

The **Nuclear Power** curriculum prepares students for careers in the nuclear industry and government with electric utility companies, in regulatory positions with the federal or state governments, or for major contractors on the design and testing of improved reactors for central-station power generation or for propulsion of naval vessels.

The **Radiation Sciences** curriculum prepares students to pursue careers in health physics and the medical applications of radiation and nuclear processes. Advanced study at the M.S. level in either medical physics or health physics is recommended for students pursuing this option. Medical physicists may participate in the radiation treatment of cancer patients and in advanced medical imaging and diagnostic

procedures. Health physicists may operate radiation protection programs at nuclear industrial facilities, hospitals, laboratories, and nuclear power plants, or may develop new methods of measuring ionizing radiation.

Because the curriculum provides a strong foundation in math and physics, it also prepares the graduate for work in many areas where a broad technical background is more important than specialization in a specific field. Thus, the graduate is also prepared to work in any area where a broad engineering background is helpful, such as management, marketing, etc. Recent graduates have found opportunities in finance and in consulting services. Deregulation of the electric utility industry is also providing opportunities for students who understand both electricity generation and business principles.

Finally, the curriculum gives students excellent preparation for graduate study in nuclear engineering as well as allied fields in science and engineering. Recent graduates have elected to pursue graduate study in physics, medicine, and business in addition to nuclear engineering.

## **Bachelor of Science in Nuclear Engineering**

The undergraduate program leads to a Bachelor of Science degree in **Nuclear Engineering** and encompasses a wide range of topics. Because the breadth and rate of change in this field requires that the nuclear engineer have a broad educational background, the curriculum consists of physics, math, materials science, engineering mechanics, electronics, thermodynamics, heat transfer, computers, courses in the humanities and social science areas, and numerous elective courses. Courses of a specific nuclear engineering content are taken primarily in the fourth year.

The undergraduate program appeals to students who have interests in nuclear engineering, and to students who have strong interests in physics, mathematics, and engineering, but do not wish to specialize in a particular field in the early part of their college studies.

The UW-Madison undergraduate **Nuclear Engineering** Program is divided into two tracks; a power track and a radiation sciences track.

### **Power Track**

The power track focuses on power generation applications of nuclear engineering, and is designed for students wishing to pursue careers in the nuclear power industry. The curriculum first provides a strong foundation in physics, chemistry, mathematics, computing methods, and the engineering sciences. It then applies this broad science and engineering knowledge to basic principles of nuclear reactors: nuclear reactor analysis, radiation transport and shielding, heat transfer in nuclear reactor systems, and nuclear reactor design. The student also has the opportunity to choose a number of technical electives he or she finds particularly appealing. This can include courses in nuclear materials, power plant technology, advanced fission or fusion power systems, or other suitable courses chosen in consultation with the advisor.

### **Radiation Sciences Track**

The Radiation Sciences track focuses on the non-power applications of nuclear engineering. Like the Power Track, it provides the same strong foundation in a broad range of disciplines. This track is identical to the Power Track in the first two years and differs only slightly in the third year. It is in the final year that the Radiation Sciences track differs significantly from the Power track. It includes courses on biological effects of radiation, radiation detection and instrumentation, shielding of radiation, the safe handling and disposal of radioactive materials, and a number of medical physics electives. It is recommended that students pursue a M.S. degree in either **Medical Physics** or **Health Physics** after obtaining the B.S. degree. The curriculum has been developed by a joint effort of the **Engineering Physics** and **Medical Physics** departments.

## Track Selection

Students wishing to select the **Radiation Sciences Track** should obtain, sign and submit an **Option Declaration Form** to the EP Department Student Services Office (144 ERB). **Unless this declaration is submitted, the Power Track is assumed.**

## Objectives and Expected Outcomes

The objectives of the **Nuclear Engineering** Program are to:

- (a) educate students in the fundamental subjects necessary for a career in nuclear engineering, and prepare students for advanced education in it and related fields.
- (b) educate students in the basics of instrumentation, design of laboratory techniques, measurement, and data acquisition, interpretation and analysis.
- (c) educate students in the methodology of design.
- (d) provide and facilitate teamwork and multi-disciplinary experiences throughout the curriculum.
- (e) foster the development of effective oral and written communication skills.
- (f) expose students to environmental, ethical and contemporary issues.

**Nuclear Engineering** Program graduates are expected to have...

1. an ability to identify, formulate, and solve engineering problems. This includes:
  - (a) an ability to apply knowledge of basic mathematics, science and engineering.
  - (b) an ability to apply advanced mathematics, science and engineering, including atomic and nuclear physics, and the transport and interaction of radiation with matter, to nuclear and radiological systems and processes.
  - (c) an ability to design a system, component or process to meet desired needs.
  - (d) an ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
2. an ability to measure nuclear and radiation processes.
3. an ability to work professionally in one or more nuclear or radiological fields of specialization.
4. an ability to design and conduct experiments, as well as to analyze and interpret data.
5. an ability to function on multi-disciplinary teams.
6. knowledge of professional and ethical standards.
7. an ability to communicate effectively.
8. the broad education necessary to understand the impact of engineering solutions in a global and societal context.
9. a recognition of the need for, and ability to engage in, life-long learning.
10. a knowledge of contemporary issues.

## Some Friendly Advice

An alumnus who currently has the title of Manager at an important government facility expressed a view supported by others:

*Engineers must be well rounded; a tremendous amount is expected of us by employers and the public. Communication skills, interpersonal relationships, team building, and positive attitude are essential for success.*

*Tolerance for others' opinions (regardless of how misguided we may feel they are) is also extremely important.*

*Transcending this there must be an inner commitment to excellence. I don't think this can be taught, but everyone must be challenged to excellence.*

*Mediocrity should be sneered at, disdained - - - and never accepted. The faculty has a real challenge to motivate young engineers to not accept anything "half-way," anything less than excellence.*

# Curriculum Requirements

The curriculum applies to students who entered the program after May 2001. Students admitted prior to May 2001 may petition the department to select features of the new curriculum. For curriculum requirements prior to May 2001, see earlier versions of this document.

## Nuclear Engineering - Power Track (for students entering the program after May 2001) Suggested Sequence

Fall Semester	Cr	Spring Semester	Cr
<b>Freshman Year</b>			
Chem 109 General & Anal Chemistry I <sup>1</sup>	5	EMA 201 Statics <sup>3</sup>	3
Math 221 Calculus & Analytic Geom.	5	Math 222 Calculus & Analytic Geom.	5
Communications "A" Elective	2	Stat 224 Statistics for Engineers	3
InterEgr (EPD) 160 Intro. to Engineering <sup>2</sup>	<u>3</u>	ME 231 Graphics	2
	15	Liberal Studies Electives	<u>3</u>
			16
<b>Sophomore Year</b>			
Math 234 Calculus-Fn. of Several Variables	3	Math 319 Differential Equations	3
Phys 202 General Physics	5	Physics 241 or Phys. 205 Modern Phys.	3
EMA 202 Dynamics	3	ME 361 Engineering Thermodynamics	3
NE 271 Engr. Prob. Solving I <sup>4</sup>	3	EMA 303 Mechanics of Materials	3
EPD 275 or CA 105 Public Speaking	<u>2</u>	EMA 307 Mechanics of Materials Lab	1
	16	Liberal Studies Electives	<u>3</u>
			16
<b>Junior Year</b>			
NE 305 Fund. of Nuclear Engr.	3	NE 405 Nuclear Reactor Theory	3
Math 321 Appl. Math. Analysis	3	NE 408 Ionizing Radiation	3
M.S.&E 350 Intro. to Materials Science	3	ChE 320 Intro. Transport Phenom.	4
Technical Elective	3	Computing Elective	3
Liberal Studies Electives	<u>4</u>	ECE 376 Electrical Circuits	<u>3</u>
	16		16
<b>Senior Year</b>			
NE 411 Nuclear Reactor Engr.	3	NE 412 Nuclear Engineering Design	5
NE 427 Nuclear Instrum. Lab	2	NE 428 Nuclear Reactor Lab.	2
Nuclear Engineering Elective	6	NE 571 Econ. & Envir. Aspects of	
Liberal Studies Electives	3	Nuclear Energy	3
EPD 397 Technical Writing	<u>3</u>	Nuclear Engineering Elective	3
	17	Liberal Studies Elective	<u>3</u>
			16

### **Total credits required for graduation: 128**

1. Students should take Chem 109, 5 cr.; students with inadequate preparation in high school chemistry may substitute Chem 103 and 104, for a total of 9 credits. Three credits of Chem 103/104 may be counted as Technical Electives credits.
2. Students who were not able to take InterEgr (EPD) 160 as freshmen may, with the approval of their advisor, substitute 3 credits of electives from courses offered in the College of Engineering or in the Departments of Chemistry, Computer Science, Mathematics, and Physics.
3. Students may substitute Phys 201, 5 cr., for EMA 201, 3 cr., with the approval of their advisor.
4. Computer Science 310 is an acceptable substitute for NE 271.
5. ME 363 and ME 364 are acceptable substitutes for ChE 320.

# Nuclear Engineering - Radiation Sciences Track

(for students entering the program after May 2001)

## Suggested Sequence

Fall Semester	Cr	Spring Semester	Cr
<b>Freshman Year</b>			
Chem 109 General & Anal Chemistry I <sup>1</sup>	5	EMA 201 Statics <sup>3</sup>	3
Math 221 Calculus & Analytic Geom.	5	Math 222 Calculus & Analytic Geom.	5
Communications "A" Elective	2	Stat 224 Statistics for Engineers	3
InterEgr (EPD) 160 Intro. to Engineering <sup>2</sup>	<u>3</u>	ME 231 Graphics	2
	15	Liberal Studies Electives	<u>3</u>
			16
<b>Sophomore Year</b>			
Math 234 Calculus-Fn. of Several Variables	3	Math 319 Differential Equations	3
Phys 202 General Physics	5	Physics 241 or Phys. 205 Modern Phys.	3
EMA 202 Dynamics	3	ME 361 Engineering Thermodynamics	3
NE 271 Engr. Prob. Solving I <sup>4</sup>	3	EMA 303 Mechanics of Materials	3
EPD 275 or CA 105 Public Speaking	<u>2</u>	EMA 307 Mechanics of Materials Lab	1
	16	Liberal Studies Electives	<u>3</u>
			16
<b>Junior Year</b>			
NE 305 Fund. of Nuclear Engr.	3	NE 405 Nuclear Reactor Theory	3
Math 321 Appl. Math. Analysis	3	NE 408 Ionizing Radiation	3
M.S.&E 350 Intro. to Materials Science	3	Phys 322 Electromagnetic Fields	3
Technical Elective	3	Computing Elective	3
Liberal Studies Electives	<u>4</u>	ECE 376 Electrical Circuits	3
	16	Free Elective	<u>1</u>
			16
<b>Senior Year</b>			
NE 427 Nuclear Instrum. Lab	2	NE 412 Nuclear Engineering Design	5
Med Phys 501 Radiological Physics & Dosimetry	3	NE 428 Nuclear Reactor Lab.	2
Medical Physics Electives	6	NE 571 Econ. & Envir. Aspects of Nuclear Energy	3
Liberal Studies Electives	3	Medical Physics Elective	3
EPD 397 Technical Writing	<u>3</u>	Liberal Studies Elective	<u>3</u>
	17		16

**Total credits required for graduation: 128**

1. Students should take Chem 109, 5 cr.; students with inadequate preparation in high school chemistry may substitute Chem 103 and 104, for a total of 9 credits. Three credits of Chem 103/104 may be counted as Technical Electives credits.
2. Students who were not able to take InterEgr (EPD) 160 as freshmen may, with the approval of their advisor, substitute 3 credits of electives from courses offered in the College of Engineering or in the Departments of Chemistry, Computer Science, Mathematics, and Physics.
3. Students may substitute Phys 201, 5 cr., for EMA 201, 3 cr., with the approval of their advisor.
4. Computer Science 310 is an acceptable substitute for NE 271.

# Electives Requirements

## For students entering the program after May 2001

### Liberal Electives (16 credits)

Sixteen credits from the College of Engineering, the Institute for Environmental Studies, or the College of Letters and Science that carry H, S, L, or Z Class Search (formerly *Timetable*) breadth designators must be taken to fulfill the Liberal Electives Requirements. These credits must fulfill the following sub-requirements:

- I. A minimum of two courses must be from the same department or program. At least one of these two courses must be above the elementary level (i.e. must have I, A, or D level designator), as indicated in Class Search.
- II. A minimum of six credits must be in courses designated as humanities (H, L, or Z), and an additional minimum of three other credits designated as social studies (S or Z). Foreign language credits count as H credits.
- III. At least three credits must be in courses designated as ethnic studies (lower case "e" in Class Search). These credits may help satisfy regulations I or II as well, but may count only once toward the total credits required.

### Communications "A" Elective (2 cr)

Students must take one course from the following list:

EPD 155	Basic Communication	2 credits
Eng 100	Freshman Composition	3 credits
Comm Arts	100 Introduction to Speech Composition	3 credits
Ag Journ 100	Introduction to Communication	3 credits
ILS 200	Critical Thinking and Expression	3 credits

Many students find it useful to take EPD 155 and EPD 160 concurrently in the fall semester of their freshmen year.

### Communications "B" Elective

This requirement is met by EPD 397, which is a required course. Other communication "B" courses may be substituted upon approval of the department chair.

### Computing Elective (3 cr)

Students must take one course from the following list:

CS 367	Introduction to Data Structures	3 credits
CS 412	Introduction to Numerical Methods	3 credits
EP/EMA 471	Engineering Problem Solving II	3 credits
EP/EMA/NE 476	Computational Engineering	3 credits

### Technical Electives (3 cr)

Technical Electives (not to be confused with Nuclear Engineering Electives or Medical Physics Electives) must be chosen from courses offered by the College of Engineering, or by the departments of Physics, Mathematics, Computer Science, or Chemistry.

### **Nuclear Engineering Electives (9 credits in the power track)**

Courses meeting the Nuclear Engineering Electives requirement are all NE courses numbered above 200 that are not part of the required curriculum. No more than 3 credits of NE 699, Independent Study, may be used to meet this requirement. Courses recommended for meeting this requirement are;

<b>Course</b>	<b>Title</b>	<b>Prerequisite(s)</b>	<b>Offering Frequency<sup>1</sup></b>
NE 234	Nuclear Reactor Operations	Cons instr	on demand
NE 371	Thermosciences Lab	ME 361, ChE 320, or cons inst	on demand
NE 406	Nuclear Reactor Analysis	NE 405	on demand
NE 423	Nuclear Eng'r Materials	M.S. &E 350 or 351	I
NE 512	Fast Breeder Reactors	NE 411	on demand
NE 520	Two-Phase Flow and Heat Transfer	ME 361 (or ChE 310 or equiv.) ChE 320 (or ME 364 or equiv.)	I, odd
NE 525	Introduction to Plasmas	1 course each in mechanics & E&M (beyond elem. physics)	I, II
NE 536	Feasibility of Controlled Fusion	NE 405, 525	on demand
NE 541	Radiation Damage in Metals	M.S. &E 351 or 350	on demand
NE 550	Adv Nuclear Power Engineering	NE 405, 411	I, even
NE 555	Nuclear Reactor Dynamics	NE 405	II, odd
NE 565	Power Plant Technology	ME 361 or cons inst	II
NE 569	Health Physics	Cons inst	I
NE 574	Probabilistic Risk Analysis	Stat 311 or Math 431	II, even

### **Medical Physics Electives (9 credits in the radiation sciences track)**

Courses meeting the Medical Physics Electives requirement are Medical Physics courses numbered 400 and above and selected Physics courses at or above the 400 level. No more than 3 credits of NEEP 699, Independent Study, may be used to meet this requirement. Courses of interest include:

<b>Course</b>	<b>Title</b>	<b>Prerequisite(s)</b>	<b>Offering Frequency<sup>1</sup></b>
Med Phys 463	Radioisotopes in Medicine & Biology	Introductory physics	I
Med Phys 473	Imaging in Medicine	1 yr each of physics and calculus	I
Med Phys 475	Diagnostic Ultrasound Physics	Mod. phys, calc, and Fourier anal.	I
Med Phys 566	Physics of Radiotherapy	Med Phys 501	II
Med Phys 567	Physics of Diagnostic Radiobiology	Mod. phys, calc, and Fourier anal.	I
NE/MP 569	Health Physics	Cons inst	II

Med Phys 463 and 569 are especially recommended for students in this track.

<sup>1</sup>- Key: I = Fall Semester; II = Spring Semester; SS = Summer Session; even and odd refer to the year in which courses taught in alternate years are given.

# Special Programs for Nuclear Engineering Students

The Department offers four special programs for **Nuclear Engineering** students. The **Scholars Program** and the **Distinguished Scholars Program** provide increased flexibility for students wishing to develop an individualized curriculum. The **B.S.-M.S. Dual Degree Programs** allow qualified students to get a head start on graduate study. Students earn both the **B.S.** and **M.S.** degrees simultaneously in about five years with a net credit reduction of 4 or 5 credits compared with doing the two programs separately. They are aimed primarily at students wishing to obtain a terminal **M.S.** degree. The **Honors in Research Program** is designed for students who want to get involved in research and receive recognition on their diploma and transcript. It is highly recommended for students contemplating graduate study.

## Scholars Program

Students who have completed the first semester of study specified in the regular curriculum and who have achieved a 3.0 GPA may request admission to the **Scholars Program**. With the approval of the student's advisor and the **EP Department Chair**, a student in this program may be exempted from specific course requirements except for the following:

1. the total number of credits required is 128;
2. at least 51 credits must be in engineering sciences, and these 51 must include NE 412 plus at least 12 more credits of NE courses. (Computer Science courses and Physics 311 and 321 may be counted as engineering science);
3. at least 19 credits must be in mathematics courses;
4. at least 13 credits must be in physics and chemistry;
5. the Liberal Studies requirements (page 6) must be met;
6. the Communications "A" Elective (page 6), EPD 275 or CA 105, and EPD 397 must be satisfied.

A student in this program must maintain a cumulative GPA of 3.0, and the main thrust of the academic work must be in **Nuclear Engineering**. To meet this criteria, the Scholar must complete NE 412 or choose an acceptable substitute fully satisfactory to the student's advisor and the **EP Department Chair** (see comment # 2 under **Distinguished Scholars Program** below).

Later entrance into this program is permitted for **NE** students who have followed the prescribed **B.S. NE** curriculum and have a cumulative GPA of 3.0. Students on the Madison campus may enter the program as late as the beginning of the fifth semester. Students transferring from other institutions may enter as late as the beginning of the seventh semester provided their GPA for the first on-campus semester is at least 3.0.

To apply for the **Scholar's Program**, obtain, sign and submit an **Option Declaration Form** to the EP Department office (153 ERB) or the EP Department Student Services office (144 ERB).

## Distinguished Scholars Program

**NE** students who achieve a 3.70 GPA or above for the first two semesters on campus may request admission to the **Distinguished Scholars Program**. This program provides increased flexibility for students wishing to develop an individualized curriculum. Necessary stipulations are that the student maintains a cumulative GPA of 3.5 or greater and that the main thrust of academic work be along the lines of **Nuclear Engineering** education.

The "thrust of **Nuclear Engineering** education" incorporates several concepts which the student must recognize:

1. The established undergraduate curriculum has been developed after much effort and over a period of many years to meet the student's needs. The Distinguished Scholar should choose carefully before omitting any of the required courses in the curriculum.
2. The course NE 412 "Nuclear Engineering Design" is the culmination of the undergraduate curriculum. It requires the student to integrate and apply knowledge obtained from most of the required technical courses to the design of a nuclear technology system. It is the culmination of all the design content in the curriculum, design being a critical aspect of engineering education. To meet the "thrust of Nuclear Engineering education," the **Distinguished Scholar** must complete NE (NEEP) 412 or choose an acceptable substitute fully satisfactory to the student's advisor and the **EP Department Chair**.
3. The student should bear in mind that laboratory experiences are important parts of engineering education; the student is urged to complete both NE 427 "Nuclear Instrumentation Laboratory" and NE 428 "Nuclear Reactor Laboratory."
4. The Liberal Studies requirement (page 6) must be satisfied.
5. The Communications "A" Elective (page 6), EMA 275 or CA 105, and EPD 397 must be satisfied.
6. The total number of credits required is 128.

Later entrance into the **Distinguished Scholars** Program is also permitted. A student may transfer into the Department from any other department on the Madison campus as late as the beginning of the fifth semester (or from any other institution as late as the beginning of the seventh semester) and still qualify for this program. A student may enter the program as late as the beginning of the fifth semester provided:

1. a course schedule closely equivalent to that contained in the **B.S. NE** curriculum has been pursued;
2. the cumulative GPA is equal to or greater than 3.70 after two semesters, 3.60 after three semesters, or 3.50 after four semesters; and
3. if transferring from off the Madison campus, the GPA for the first semester of on-campus courses is equal to or greater than 3.50.

To apply for the **Distinguished Scholar's** Program, obtain, sign and submit an **Option Declaration Form** to the **EP Department** office (153 ERB) or the **EP Department** Student Services office (144 ERB).

## **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** 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**
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 **EP 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 given in Appendix A. 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 used for both undergraduate and graduate credit.
  - b. 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 of study.
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 chair **before** deviating from the earlier program plan.

## **B.S. Nuclear Engineering - M.S. Medical Physics Dual Degree Program**

Qualified undergraduates may earn a **B.S.** degree in **Nuclear Engineering** and a **M.S.** degree in **Medical Physics** with a total of **150 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**
2. Grade point average of 3.0 or better

### **Application Procedure**

During the Spring semester of your junior year submit a letter of intent to the Chairs of the **Engineering Physics** and the **Medical Physics** Departments.

- Include with this letter a copy of your academic transcript (campus copy is acceptable), and 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 undergrad advisor and an advisor from the **Medical Physics** Department. An example is in Appendix B. Designate which courses taken during the last two years are to be counted for undergraduate and for graduate credit. Up to **5 credits** may be used for both undergraduate and graduate credit.

At the same time (Spring of junior year) apply for admission to the **M.S. Medical Physics Graduate Program** (deadline is June 25). Indicate admission for the fall of your 5<sup>th</sup> year of study. (This is the semester you will officially start in the Graduate School.)

NOTE: GRE scores are required for admission to the **M.S. Medical Physics Program**, including the Physics specialty exam.

Approval from the Engineering Physics Department, as well as admission to the Medical Physics graduate program is necessary to be accepted into the **B.S. Nuclear Engineering - M.S. Medical Physics Dual Degree Program.**

If accepted as a candidate to the Dual Degree program by both departments, a notation of admission will be placed on your transcript. Your classification will remain “NE4” for your senior year. Your classification will be changed to “G655” (Graduate Status-Medical Physics Department) and you will pay graduate fees for the final year of study.

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. MP** degrees apply. See the undergraduate and graduate advising materials for a description of the requirements.
2. The total number of credits must be at **150 for completing the Dual Degree Program**. Up to **5** credits may be used for meeting both the undergraduate and graduate degree requirements.
3. Changes in your program must be approved by both of your advisors and a revised program plan submitted to both departments prior to deviating from the earlier program plan.

## **Undergraduate Honors in Research Program**

### **Expectations for Honors in Research Projects**

The research should be such that the student participates in the creation of new knowledge, experiences the excitement of the research process, and makes a contribution so that it would be appropriate to include the student’s name on scholarly publications resulting from the research. The research need not be an independent effort by the student, but can be participation in a larger team effort, as long as it meets the criteria above.

### **Admission Requirement**

At least two semesters completed on the Madison campus with a cumulative GPA of **at least 3.5**.

### **Admission Process**

The student should identify and obtain the concurrence of an appropriate professor to serve as the thesis advisor. The student should submit a letter to the Engineering Physics department chair requesting admission, stating the approximate topic of the proposed research, and identifying the proposed thesis advisor under whose guidance the student will be working. The topic should be appropriate to the major. A letter from the proposed thesis advisor supporting the application should be included.

### **Academic Credit**

Students register for credit in Honors in Undergraduate Research (NE 489). Students may register for 1 to 3 credits per semester. A grade of “P” (Progress) will be assigned each semester until the student completes the senior thesis or drops out of the program, at which time a final grade is assigned. This becomes the grade for all credits taken in NE 489.

### **Senior Thesis**

A senior thesis worth 3 credits of NE 489 is required. The senior thesis is a written document reporting on a substantial piece of work. It should be written in the style of a graduate thesis. The thesis advisor determines the grade the student receives for the thesis. A bound copy of the thesis should be submitted to the Engineering Physics department office.

Before the end of the last semester of undergraduate studies, the senior thesis should be presented by the student to a committee of three professors in a publicly announced seminar. Interested faculty and students will be invited to attend.

### **Honors Designation**

“Honors in Research” designation will be awarded to graduates who meet the following requirements:

1. Satisfaction of requirements for an undergraduate degree in either **Engineering Mechanics** or **Nuclear Engineering**.
2. A cumulative grade-point average of at least 3.3.
3. Completion of a senior honors thesis (3 credits of NE 489) with a grade of B or better.
4. Completion of a total of at least 8 credits in NE 489.

### **Recognition**

The designation, "**Honors in Research**" will be recorded on the student's transcript and diploma.

## **Advising**

The staff in the **Engineering General Resources** office, Room 1150 Engineering Hall, advise all EGR students. However, EGR students interested in nuclear engineering are also encouraged to meet with Prof. Corradini (153 ERB, 263-1646, corradini@engr.wisc.edu).

Once you have been admitted to the **NE** program you are assigned a **NE** advisor. **Students retain the same advisor until graduation, even if they do not progress in class standing at the normal rate.** The list of faculty advisors is available in the Department office. Before registering, each student must meet with their faculty advisor for assistance in planning courses and meeting degree requirements and objectives. **You must consult with an advisor and turn in your course advising form to the EP Department office (153 ERB) or to the EP Department Student Services office (144 ERB) before you register for the following semester. A hold is placed on your ability to register until this form is received.**

## **DARS Reports**

The DARS report is a computer generated record of courses you have taken and where you stand relative to degree requirements. It is an aid to help you and your advisor in tracking your progress towards graduation. This record can be obtained through your MyUW webpage. You should be aware that the DARS report is **unofficial** and may contain errors. **You should check your DARS report on a regular basis for errors and bring them to the attention of your advisor**, so that a correction can be made. Your record will still be subject to an audit at graduation.

## **Tips to Help You**

### **Caution- Course Planning**

There are several sequences of courses in the program in which one course is a prerequisite for the next course in the sequence. Because some courses are only taught one semester each year, if you do not plan your program in advance you may find your graduation delayed by as much as a year. If you do not follow the standard four-year program, you should prepare an alternative program in advance and check it with your advisor. Any deviation from this plan should be carefully considered with respect to prerequisites and course offering frequencies.

## **Course Recommendations**

1. Mathematics 322 and 340 are additional useful courses beyond the required mathematics courses and may be of particular interest for students interested in graduate study.
2. The curriculum requires Stat 224, but you may want to take a more challenging course, Stat 301, instead; if so, a substitution can be requested from your advisor. A course in Statistics such as Stat 311 or 431 is very desirable for students interested in reactor safety and operation. Stat 311 or 431 is a prerequisite for NE 574. Students may request to substitute Stat 224 with Stat 311 or 431.
3. Physics 322 is recommended for students interested in plasma physics, fusion, or applied superconductivity. It is a prerequisite for NE 525.
5. Physics 311, a more advanced course in dynamics, may be used to replace EMA 202. Students planning to enter graduate school, especially in the areas of plasmas, fusion, or radiation damage should take Physics 311.
6. Physics 623, Electronic Aids to Measurement, is recommended for students in the **Radiation Sciences** track.

## **Summer School Course Offerings**

Currently, the department plans to offer NE 412 during the eight week summer session.

## **Independent Study – NE 699**

Undergraduate students are strongly encouraged to enroll in NE 699, Independent Study, to gain exposure to research. This will broaden the mental horizons of the student participants, will help those wondering about graduate study to make a decision, and will help those aimed towards graduate study to compare areas of research. Students work on research projects under the guidance of a professor. Together they agree on the work to be done and the credits earned (usually 1-3) per semester.

## **Pass - Fail Privilege**

Students in good standing may elect to take up to two liberal studies or free elective courses on a pass/fail basis. See College of Engineering regulations.

## **Co-op/Internship Program**

The Co-op/Internship program is an excellent way to get engineering experience while working in a company, either for a summer or a semester. Many students have found these programs extremely valuable in enhancing their education and are frequently in a favored position to gain employment with the company after graduation. Consult with Mark Swandby, Dept. Administrator, (146 ERB, 263-1647) and the Engineering Career Services office, M1002 Engineering Centers Building, for further information.

## **Hourly Work**

Working on research with a faculty member in the Department is a very valuable experience for undergraduates. A number of undergraduates are employed by faculty members either under the work-study program or on research grants. Students are encouraged to explore such opportunities by talking to members of the faculty.

## **Reactor Operations**

Students interested in reactor operations may wish to become involved in the operation of the 1 MW TRIGA reactor located in the Department. NE 234, Reactor Operations, is usually offered in the Fall in odd numbered years. However, it will next be offered in Spring 2010, then Fall 2011. Successful completion of the program may lead to a reactor operating license and subsequent employment in the reactor laboratory. Many employers view such experience very favorably. Interested students should contact the Reactor Director, Mr. Agasie (1209 ME, 262-3392), in their freshman or sophomore years.

### **Letters of Recommendation**

The letters of recommendation you will request as a senior will have a significant effect on your job opportunities, salary offers, graduate fellowship opportunities, admission to graduate schools, and so on. It is important that the writers of such letters be able to say that they know you well. Therefore, it can be very much worth your effort to ensure that one or two of your instructors, advisors, or faculty employers know you really well. For example, you might do an extra project for an instructor in a course, you might work as a student hourly employee in a laboratory, you might take independent-study courses, or you might volunteer for Engineering Expo or other activities which will favorably call you to the attention of faculty. Participating in class discussions and asking many intelligent questions is also helpful.

### **Professional Registration**

Most states license professional engineers. Registration as a professional engineer is a requirement for some jobs and generally increases the earning power and responsibility of the licensed individual. The registration process requires exams on Fundamentals of Engineering (FE) and on the principles and practice of engineering. Seniors can usually pass these exams easily and are urged to take them. Information may be obtained from: Department of Regulation and Licensing, Bureau of Business and Design Professions, P.O. Box 8935, Madison WI 53708-8935, phone 608-266-5511 (<http://www.drl.state.wi.us>). NCEES (<http://www.ncees.org/>) has information and study guides for the FE exam. Be aware that the FE exam is given only in April and October, and the deadline for filing applications is typically a few months earlier. Therefore, students should begin planning for the exam while they are still juniors.

### **Special Graduation Requirements**

Students should particularly note the requirements for graduation given in 34b, c, and f of the "Official Regulations Regarding Enrollment, Scholarship, and Graduation for Undergraduates in The College of Engineering of University of Wisconsin-Madison." This can be found under the "graduation" tab in the Student Services section of the College of Engineering webpage. Among other requirements paragraph 34 specifies GPA requirements for the last 60 credits, for courses taken in your major, and for the student's last semester and last two semesters.

### **Credit for Previous Work**

Students who have done college level work elsewhere can usually transfer credits earned at other colleges. See Ms. Bonnie Schmidt (1150 EH, 262-5510) to arrange a transfer of credits. In addition, there is the possibility of having prerequisites waived, of having course requirements waived, or of receiving course credit. Generally, prerequisites can be waived by the instructor teaching the course. The Department Chair can waive course requirements, and the department that offers a course can give credit for one of its courses either by examination or on the basis of evidence of equivalent work.

### **Navy Nuclear Power School Graduates**

Students who were trained in the Navy's Nuclear Power School often can get course credit for such courses as Math 221, 222, 234, and Physics 201, 202, or NE 371. Note: The word "School" is not to be interpreted as "Program".

## **Scholarships and Financial Aid**

Most financial assistance is awarded through the Office of Student Financial Aid (333 East Campus Mall #9701, 262-3060). Some financial assistance is also available from Engineering General Resources (1150 Engineering Hall, 262-2473 or 262-3484). The Department has a limited amount of scholarship funds awarded on a merit basis. An application for departmental scholarships is not necessary; all students are automatically considered in the competition for departmental scholarships. The Department of Energy, the National Academy for Nuclear Training, and the American Nuclear Society award nuclear engineering scholarships. See the Department Administrator Mark Swandby in Room 146 ERB for application information.

# Graduate Study

## **M.S. and Ph.D. in Nuclear Engineering and Engineering Physics**

The Department offers the **Master's of Science** and **Doctor of Philosophy** degrees in **Nuclear Engineering and Engineering Physics**. Students interested in graduate work in **NEEP** can find more information at the **NEEP Graduate Program** website, [www.engr.wisc.edu/ep/neep/current/grad](http://www.engr.wisc.edu/ep/neep/current/grad) or from The Academic Policies and Procedures for Graduate Work in Nuclear Engineering and Engineering Physics available in the Department Office. Additional information about opportunities and financial aid may be obtained from the Department Administrator, Mr. Mark Swandby in 146 ERB. Information from other graduate schools is available on the bulletin board outside the Department Office, in the library, and in the Graduate School in Bascom Hall.

## **Senior-Grad Status**

Seniors within six credits of graduation, who otherwise meet the graduate school admission requirements, may apply for concurrent enrollment as an undergraduate and as a graduate student and get a head start on a graduate degree. See the Graduate School for further information.

## **M.S. in Medical Physics-Health Physics Option**

A bachelor's degree in **Nuclear Engineering** provides an excellent background for an **M.S.** degree in **Medical Physics** with a Health Physics option. The **Radiation Sciences** track is especially designed for students wishing to pursue this path. NE courses which are required for this **M.S.** degree are: NE 305, NE 427, 569, and 571. **Medical Physics** courses which are required for the **M.S.** and can be taken by undergraduates are: Med Phys 410, 463, 501, and 567. In addition to these requirements, **M.S.** candidates must also take Med Phys 664, one credit of 661, 662, 663, or 665, and also one credit of 699 and 900. Even if some of these required courses are taken while the student is an undergraduate, the Graduate School still requires a total of at least 16 graduate credits after graduation with a **B.S.** degree.

## **Graduate Record Examination**

Students planning to enter graduate school should take the GRE in the fall of their senior year. This exam is required by many graduate schools and for most graduate fellowships. Details may be obtained from the Graduate School Fellowships Office, 217 Bascom Hall.

# Special Programs

## **Engineering Honors in the Liberal Arts**

The Engineering Honors in the Liberal Arts program is designed for engineering students with unusual ability and interest in the liberal arts and who desire access to the special honors sections open to L&S honors students. For further information, see the Undergraduate Catalog or contact Dr. Suzy Sandrik in the Engineering General Resources office, 1150 Engineering Hall (262-4794).

## **Certificate in Technical Communications**

The completion of approximately 15 elective credits in oral communication and technical writing leads to a Certificate of Technical Communication; the award is noted on the student's transcript. Representative courses include EPD 397 "Technical Writing," EPD 398 "Technical Communications Internship," EPD 275 "Technical Presentations," EPD 395 "Elements of Computer-Assisted Publishing," and CA 464 "Theory and Practice of Persuasion." The program will help students become better communicators as engineers or will prepare them to pursue careers in technical writing. Contact the Department of Engineering Professional Development (Room M1050 ECB, 262-2472) for further information.

### **Certificate in Japanese Studies for Engineering Majors**

The completion of the following courses leads to a Certificate in Japanese Studies for Engineering Majors; the award is noted on the student's transcript: East Asian 253 "Introduction to Japanese Civilization" (3 cr.); East Asian 103 and 104 "First and Second Semester Japanese" (12 cr.); Engineering Professional Development 374 and 375 "Technical Japanese I and II (6 cr.); History 455 "Japan's Modern Century" (4 cr.); and Business 461 "Comparative Management in Asia" (3 cr.) or other courses in Japanese studies. The student should note that, of the total of 28 credits, at least 17 may qualify as Liberal Electives. Contact Professor James L. Davis (Room 1056D Engineering Centers Building, 262-4810) for further information.

### **Letters & Science Second Major for Engineering Students**

Many **NE** students can easily satisfy the requirements of the Mathematics or Physics Departments for a second major by choosing appropriate electives. Such a second major is recorded on the transcript. Second majors must be approved in advance, first by the appropriate L&S department (by approval of a "Declaration of Major" form) and then by the Associate Dean of the College of Engineering. For details see the L&S Bulletin.

The requirements of the Physics Department for a second major are **30 credits** of Physics courses plus a laboratory requirement that is automatically satisfied by NE students who take NE 427 and NE 428. There are two options by which a student may satisfy the requirements of the Mathematics Department for a second major. For a **NE** student the simplest option requires six courses beyond Math 234, and the six must include Math 320 or 340 and at least two math courses numbered above 500. Consult with the appropriate department office for the latest requirements.

## **Additional Information**

### **Department Colloquia**

Colloquia are academic seminars on a broad field of study, usually led by a different lecturer at each meeting. The UW NEEP colloquia series presents the work of experts outside of the university to the faculty and students, broadening the understanding of the current scientific cutting edge, while presenting the university capability to the visitor. These lectures are announced on the Department bulletin board outside 153 ERB and the College of Engineering on-line calendar on the website [www.engr.wisc.edu](http://www.engr.wisc.edu). Colloquia are usually held on Tuesday afternoons at 4:00 PM (refreshments at 3:45 PM). Undergraduates are encouraged to attend.

### **ANS Student Chapter**

Undergraduates are urged to join the Student Chapter of the American Nuclear Society. This gives them an opportunity to meet other students, take an active part in organizing activities, meet visiting speakers, and hear talks in their fields presented on a level appropriate for undergraduates. There are technical, organizational, and social meetings, including fall and spring picnics and an annual regional meeting at which students present papers. The ANS advisor is Prof. Paul Wilson (419 ERB, 263-0807, [wilsonp@engr.wisc.edu](mailto:wilsonp@engr.wisc.edu)).

### **WIN Student Chapter**

A new chapter of Women in Nuclear has recently been started at UW-Madison. The U.S. Women in Nuclear organization was established in May 1999 with the following strategic objectives: to support an environment in nuclear energy and nuclear technologies in which women and men are able to succeed, to provide a network through which the women in these fields can further their professional development, and to provide an organized association through which the public is informed about nuclear energy and nuclear technologies. The WIN advisor is Michelle Blanchard (141 ME, 262-3392, [mblanchard@engr.wisc.edu](mailto:mblanchard@engr.wisc.edu)).

### **Engineering Expo**

The Engineering Expo is a biennial event (held in spring of odd-numbered years) that gives the public a unique opportunity to learn about engineering. It is also a great learning experience for students, one that is highly regarded by employers. Students can contribute a few hours per semester or several hours per week - from working on an exhibit to planning publicity. You might consider joining with the ANS chapter and other students in preparing exhibits that demonstrate nuclear engineering concepts. Interested students should speak with their advisor.

### **Faculty-Student Committee (FSC)**

The Engineering Physics Department wants input from students. A standing committee of students and two faculty members exists to discuss problems and bring them to the attention of the department. Student members are encouraged to attend Department meetings and to present student opinions at these meetings. The FSC conducts a survey periodically of all students in the Engineering Physics Department for the purpose of finding out about problems. In addition, a **Suggestion Box**, located outside room 105 ERB, is available for comments and suggestions. Recommendations on course, curriculum changes, and department procedures are taken very seriously by the faculty. Most recommendations have been implemented. For more information, contact Professor Plesha or Witt.

### **Duplicating**

Students who need to use duplicating equipment for research projects must get permission from their professor and a fund and account number to charge. Senior Design Project duplicating should be approved by the department office. Use of departmental photocopying equipment for personal purposes is not permitted.

### **Personal Property**

Any personal property, including personal computers and reference textbooks, are the responsibility of the student. Neither the Department nor the University will assume liability for loss or damage of any personal belongings or equipment.

## Departmental Office Staff

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

## Reactor Lab Staff

<b>Robert Agasie</b>	Reactor Director	1209 ME	262-3392	<a href="mailto:agasie@engr.wisc.edu">agasie@engr.wisc.edu</a>
<b>Michelle Blanchard</b>	Reactor Supervisor	141 ME	262-3392	<a href="mailto:mblanchard@engr.wisc.edu">mblanchard@engr.wisc.edu</a>
<b>Kevin Austin</b>	Reactor Research Mgr.	101 ME	262-3392	<a href="mailto:kaustin@engr.wisc.edu">kaustin@engr.wisc.edu</a>
<b>Corey Edwards</b>	Reactor Inst Tech	5 ME	890-1924	<a href="mailto:csedwards@engr.wisc.edu">csedwards@engr.wisc.edu</a>

## Nuclear Engineering 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.

<b>Name</b>	<b>Title</b>	<b>Office</b>	<b>Phone</b>	<b>E-mail</b>
<b>Matthew S. Allen</b>	Assistant Professor	535 ERB	890-1619	<a href="mailto:msallen@engr.wisc.edu">msallen@engr.wisc.edu</a>
<b>Todd R. Allen</b>	Assistant Professor	529 ERB	265-4083	<a href="mailto:allen@engr.wisc.edu">allen@engr.wisc.edu</a>
<b>Vicki Bier</b>	Professor (also IE)	3234 ME	262-2064	<a href="mailto:bier@engr.wisc.edu">bier@engr.wisc.edu</a>
<b>Joseph Bisognano</b>	Professor (Dir SRC)	103 SRC	877-2163	<a href="mailto:jbisognano@src.wisc.edu">jbisognano@src.wisc.edu</a>
<b>James P. Blanchard</b>	Professor	143 ERB	263-0391	<a href="mailto:blanchard@engr.wisc.edu">blanchard@engr.wisc.edu</a>
<b>Riccardo Bonazza</b>	Professor	537 ERB	265-2337	<a href="mailto:bonazza@engr.wisc.edu">bonazza@engr.wisc.edu</a>
<b>Michael Corradini</b>	Professor (also ME/IES)	151 ERB	263-1648	<a href="mailto:corradini@engr.wisc.edu">corradini@engr.wisc.edu</a>
<b>Wendy Crone</b>	Associate Professor	543 ERB	262-8384	<a href="mailto:crone@engr.wisc.edu">crone@engr.wisc.edu</a>
<b>Walter J. Drugan</b>	Professor	527 ERB	262-4572	<a href="mailto:drugan@engr.wisc.edu">drugan@engr.wisc.edu</a>
<b>Raymond J. Fonck</b>	Professor	341 ERB	263-7799	<a href="mailto:fonck@engr.wisc.edu">fonck@engr.wisc.edu</a>
<b>Chris C. Hegna</b>	Professor	521 ERB	263-0810	<a href="mailto:heгна@engr.wisc.edu">heгна@engr.wisc.edu</a>
<b>Douglass Henderson</b>	Professor	411 ERB	263-0808	<a href="mailto:henderson@engr.wisc.edu">henderson@engr.wisc.edu</a>
<b>Noah Hershkowitz</b>	Professor	337 ERB	263-4970	<a href="mailto:hershkowitz@engr.wisc.edu">hershkowitz@engr.wisc.edu</a>
<b>Daniel C. Kammer</b>	Professor	539 ERB	262-5724	<a href="mailto:kammer@engr.wisc.edu">kammer@engr.wisc.edu</a>
<b>Gerald L. Kulcinski</b>	Professor (Assoc Dean)	2630b EH	263-1601	<a href="mailto:kulcinski@engr.wisc.edu">kulcinski@engr.wisc.edu</a>
<b>Roderick S. Lakes</b>	Professor	541 ERB	265-8697	<a href="mailto:lakes@engr.wisc.edu">lakes@engr.wisc.edu</a>
<b>Gregory A. Moses</b>	Professor	407 ERB	265-6567	<a href="mailto:moses@engr.wisc.edu">moses@engr.wisc.edu</a>
<b>John M. Pfothhauer</b>	Professor (also ME)	1329 ERB	263-4082	<a href="mailto:pfot@engr.wisc.edu">pfot@engr.wisc.edu</a>
<b>Michael E. Plesha</b>	Professor	525 ERB	262-5741	<a href="mailto:plesha@engr.wisc.edu">plesha@engr.wisc.edu</a>
<b>Leslie Smith</b>	Professor (also Math)	505 VV	263-3057	<a href="mailto:lsmith@math.wisc.edu">lsmith@math.wisc.edu</a>
<b>Carl R. Sovinec</b>	Associate Professor	519 ERB	263-5525	<a href="mailto:sovinec@engr.wisc.edu">sovinec@engr.wisc.edu</a>
<b>Francesco Volpe</b>	Assistant Professor	331 ERB	262-4854	<a href="mailto:fvolpe@wisc.edu">fvolpe@wisc.edu</a>
<b>Fabian Waleffe</b>	Professor (also Math)	819 VV	262-3269	<a href="mailto:waleffe@math.wisc.edu">waleffe@math.wisc.edu</a>
<b>Paul Wilson</b>	Associate Professor	419 ERB	263-0807	<a href="mailto:wilsonp@engr.wisc.edu">wilsonp@engr.wisc.edu</a>
<b>Robert J. Witt</b>	Associate Professor	531 ERB	263-2760	<a href="mailto:witt@engr.wisc.edu">witt@engr.wisc.edu</a>

# Frequently Asked Questions

## ***The class I need to get into is full. What do I do?***

If it is an EMA, EP, or NE course, check with the Student Coordinator (Betsy Wood, 144 ERB, 263-7038) to see if additional sections are being opened or if the registration limit will be raised. If the course is in a different department, check with their department office. Also see your advisor about other options available to you.

## ***Where is my Professor's/TA's office and mailbox?***

The faculty have offices in ERB. Mailboxes are located on the first floor near the loading dock. The EP TA's are primarily in Engineering Hall; their mailboxes are in the first-floor lobby area of Engineering Hall, west of the main entrance. Check your course syllabus for your Professor's and TA's office number and office hours.

## ***What if I am sick and miss class?***

Contact your TA or Professor and inform him/her if you will be missing more than one class meeting. You will be expected to make up any work that you miss. If a serious illness arises and you cannot attend classes for an extended period, contact the Engineering Student Services Office at 262-2473.

## ***Where is the lost & found?***

The Engineering Hall Lost & Found office is located in Room 1150 Engineering Hall, phone 263-5586. The ERB Lost and Found office is located in Room 132C ERB, 263-1624 (mailroom).

## ***I finished my final exam. Can the Department Office tell me my grade for the course?***

The Department Office CANNOT disclose final grades. Check with your Professor or TA. After final grades have been turned into the Registrar's office you can get your grades using your MyUW website.

## ***What if I feel that my grade is unfair?***

First, speak to your TA or Professor. If this does not resolve your problem, then see the faculty member in charge of your course. Office hours are posted on all faculty and TA doors. If you do not receive sufficient explanation for your grade, then you may make an appointment to speak with the Chair. See the Department Office to set up a meeting time. Be sure to bring copies of any exams or quizzes with you

## ***Does the department have a website?***

Yes. The following URLs provide helpful information;

Engineering Physics: <http://www.engr.wisc.edu/ep/>  
Nuclear Engineering and Engineering Physics: <http://www.engr.wisc.edu/ep/ne/>  
College of Engineering: <http://www.engr.wisc.edu/>

AIAA chapter: <http://www.engr.wisc.edu/studentorgs/aiaa>  
ANS chapter: <http://www.atomicbadger.org/>  
WIN (Women in Nuclear) chapter <http://uw-win.org>

**APPENDIX A**  
**B.S. NE/M.S. NEEP - Dual Degree Program Plan**  
**SAMPLE Course Sequence**

Name: John Q. Public

Aug. 20, 2003

**Senior Year - Fall Semester**

Course		Undergrad Credit	Graduate Credit
NE 411	Nuclear Reactor Engineering	3	
NE 427	Nuclear Instrum. Lab.	2	2
	Liberal Studies Electives	4	
	Nuclear Engineering Electives	6	

**Senior Year - Spring Semester**

EPD 397	Technical Writing	3	
NE 428	Nuclear Reactor Lab.	2	2
NE 571	Econ. & Environ. Aspects of Nuclear Energy	3	
NE 565	Nuclear Engineering Electives	3	
	Liberal Studies Electives	3	

**Senior Year - Summer Session**

NE 412	Nuclear Engineering Design	5	
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**Fifth Year - Fall Semester**

NE 547	Engineering Analysis I		3
NE 550	Adv. Nuclear Power Engineering		3
NE 602	Applied Computational Engineering		3
NE 699	Independent Study		2

**Fifth Year - Spring Semester**

NE 541	Radiation Damage		3
NE 548	Engineering Analysis II		3
NE 520	Multiphase Flow		3

Total Credits	34	24
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Undergrad credits prior to senior year:	94
Undergrad credits 4 <sup>th</sup> and 5 <sup>th</sup> years	34
Total undergrad credits:	128
Total graduate credits:	24
Credits used for both:	(4)
Total credits:	148

Approved:

\_\_\_\_\_  
 Advisor's signature

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 Department Chair

# APPENDIX B

## B.S.-NE/M.S.-MP Dual Degree Program Plan

*Suggested course sequence for students entering the Nuclear Engineering - Radiation Sciences Track*

Fall Semester	Cr	Spring Semester	Cr
<b>Freshman Year</b>			
Chem 109 General & Anal Chemistry I	5	EMA 201 Statics	3
Math 221 Calculus & Analytic Geom.	5	Math 222 Calculus & Analytic Geom.	5
Communications "A" Elective	2	Stat 224 Statistics for Engineers	3
InterEgr (EPD) 160 Intro. to Engineering	<u>3</u>	ME 231 Graphics	2
	15	Liberal Studies Electives	<u>3</u>
			16
<b>Sophomore Year</b>			
Math 234 Calculus-Fn. of Several Variables	3	Math 319 Differential Equations	3
Phys 202 General Physics	5	Physics 241 or Phys. 205 ModernPhys.	3
EMA 202 Dynamics	3	ME 361 Engineering Thermodynamics	3
NE 271 Engr. Prob. Solving I	3	EMA 303 Mechanics of Materials	3
EPD 275 or CA 105 Public Speaking	<u>2</u>	EMA 307 Mechanics of Materials Lab	1
	16	Liberal Studies Electives	<u>3</u>
			16
<b>Junior Year</b>			
NE 305 Fund. of Nuclear Engr.	3	NE 405 Nuclear Reactor Theory	3
Math 321 Appl. Math. Analysis	3	NE 408 Ionizing Radiation	3
M.S. &E 350 Intro. to Materials Science	3	Phys 322 Electromagnetic Fields	3
Technical Elective	3	Computing Elective	3
Liberal Studies Electives	<u>4</u>	ECE 376 Electrical Circuits	<u>3</u>
	16		15

### Senior Year (Begin courses for Dual Degree Program)

Fall Semester	Ugrad	Grad	Spring Semester	Ugrad	Grad
NE 427 Nuclear Instrum. Lab <sup>2</sup>	2	2	NE 412 Nuclear Engineering		
Med Phys 501 Radiological Physics & Dosimetry	3	0	Design <sup>+</sup>	5	0
Medical Physics (MP 567, MP 463)	6	0	NE 428 Nuclear Reactor Lab.	2	0
Liberal Studies Electives	3	0	NE 571 Econ. & Envir. Aspects of Nuclear Energy <sup>§</sup>	3	0
EPD 397 Technical Writing	<u>3</u>	<u>0</u>	Medical Physics (MP 566)	3	3
	17	2	Med Physics Elective	<u>3</u>	<u>0</u>
				16	3

### Senior Year - Summer Session

*NE 412 Nuclear Engineering	5	0	<u>OR</u>	Liberal Studies Elective	3	0
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**Total Undergraduate credits: 130**

### First Year Graduate

Anatomy 328 <sup>1</sup>	0	3	Med Physics 569 Health Physics	0	4
Rad Lab Elective	0	1	Med Physics Elective	0	3
Journal Club and Seminar	0	1	Rad Lab	0	1
Med Physics Elective	0	3	Journal Club and Seminar	0	1
Med Physics Elective	<u>0</u>	<u>3</u>	Med Physics 410 <sup>3</sup>	<u>0</u>	<u>2</u>
	0	11		0	11

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NOTES:

1. Students take Anatomy 328 the fall of their first graduate year.
2. NE 427 is equivalent to Medical Physics Rad Lab - MP 664
3. Med Physics 410 is offered every other year - check the Schedule of Classes for its offering

Total senior year undergraduate credits:	36 (includes the summer)
Total undergraduate credits:	130
Total senior year graduate credits:	5 (count both as undergrad & grad credit)
First year graduate credits:	22
Graduate credits taken as undergraduate:	5
Total graduate credits:	27

**NOTICE: THIS SAMPLE CURRICULUM IS BEING EVALUATED (8/09) AND MAY CHANGE. PLEASE CHECK WITH THE STUDENT SERVICES OFFICE (144 ERB) FOR THE CORRECT VERSION.**