NUCLEAR ENGINEERING, B.S.

The Department of Engineering Physics offers the B.S. degree in nuclear engineering and M.S. and Ph.D. degrees in nuclear engineering and engineering physics.

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 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 SO2, NOX, CO2, 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 many 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 power for satellite instrumentation, to preserve food, to sterilize medical supplies, to search for faults in welds and piping, and to polymerize chemicals. Low energy plasmas are used in the manufacture of microelectronics components and to improve the surface characteristics of materials. High energy plasmas offer the possibility of a new energy source using thermonuclear fusion.

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, electronics, thermodynamics, heat transfer, computers, courses in the humanities and social science areas, and numerous elective courses. Courses of a specific nuclear engineering content come primarily in the third and fourth years.

The 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 curriculum 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, technical sales, or law. The curriculum gives students excellent preparation for graduate study in the fission and fusion areas, medical and health physics, applied superconductivity, particle accelerator technology, and other areas of engineering science in addition to study in areas such as materials science, physics, mathematics, and medicine.

OBJECTIVES OF THE NUCLEAR ENGINEERING PROGRAM

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

ENGINEERING MECHANICS AND NUCLEAR ENGINEERING PROGRAM EDUCATIONAL OBJECTIVES

The faculty recognize that our graduates will choose to use the knowledge and skills they have acquired during their undergraduate years to pursue a wide variety of career and life goals and we encourage this diversity of paths. Regarding the Engineering Mechanics program, we initially expect graduates will begin their careers in fields that utilize their knowledge, education and training in solid mechanics, fluid mechanics and dynamics/vibration in a variety of jobs in mechanical, aerospace, manufacturing and other engineering fields. Similarly, regarding the Nuclear Engineering program, we initially expect graduates will begin their careers in fields that utilize their knowledge, education and training in the interaction of radiation with matter as it applies to power generation, health and medical physics, security and safeguards and other engineering fields.

Whatever path our graduates choose to pursue, our educational objectives for the nuclear engineering and engineering mechanics programs are to allow them to:

1. Exhibit strong performance and continuous development in problem-solving, leadership, teamwork, and communication, initially applied to nuclear engineering or engineering mechanics, and demonstrating an unwavering commitment to excellence.
2. Demonstrate continuing commitment to, and interest in, his or her training and education, as well as those of others.
3. Transition seamlessly into a professional environment and make continuing, well-informed career choices.
4. Contribute to their communities.

HOW TO GET IN

ADMISSION TO THE COLLEGE AS A FRESHMAN

Students applying to UW–Madison (https://www.admissions.wisc.edu/apply/) need to indicate an engineering major (https://www.engr.wisc.edu/academics/undergraduate-academics/choosing-a-major/) as their first choice in order to be considered for direct admission to the College of Engineering. Direct admission to a major means students will start in the program of their choice in the College

of Engineering and will need to meet progression requirements (https://www.engr.wisc.edu/academics/student-services/academic-advising/first-year-undergraduate-students/progression-requirements/) at the end of the first year to guarantee advancement in that program.

CROSS-CAMPUS TRANSFER TO ENGINEERING

UW–Madison students in other schools and colleges on campus must meet the course and credit requirements for admission to engineering degree granting classifications specified in the general college requirements (https://www.engr.wisc.edu/academics/student-services/academic-advising/cross-campus-students/). The requirements are the minimum for admission consideration. Cross-campus admission is competitive and selective, and the grade point average expectations may increase as demand trends change. The student's overall academic record at UW–Madison is also considered. Students apply to their intended engineering program by submitting the online application by stated deadlines for spring and fall. The College of Engineering offers an online information tutorial and drop-in advising (https://www.engr.wisc.edu/academics/student-services/academic-advising/cross-campus-students/) for students to learn about the cross-campus transfer process.

OFF-CAMPUS TRANSFER TO ENGINEERING

With careful planning, students at other accredited institutions can transfer coursework that will apply toward engineering degree requirements at UW–Madison. Off-campus transfer applicants are considered for direct admission to the College of Engineering by applying to the Office of Admissions with an engineering major listed as their first choice. Those who are admitted to their intended engineering program must meet progression requirements (https://www.engr.wisc.edu/academics/student-services/academic-advising/transfer-students/) at the point of transfer or within their first two semesters at UW–Madison to guarantee advancement in that program. A minimum of 30 credits in residence in the College of Engineering is required after transferring, and all students must meet all requirements for their major in the college. Transfer admission to the College of Engineering is competitive and selective, and students who have earned more than 80 transferable semester credits at the time of application are not eligible to apply.

The College of Engineering has dual degree programs with select four-year UW System campuses. Eligible dual degree applicants are not subject to the 80 credit limit.

Off-campus transfer students are encouraged to discuss their interests, academic background, and admission options with the Transfer Coordinator in the College of Engineering: ugtransfer@engr.wisc.edu or 608-262-2473.

SECOND BACHELOR'S DEGREE

The College of Engineering does not accept second undergraduate degree applications. Second degree students (https://www.engr.wisc.edu/admissions/undergraduate-admissions/returning-adults-second-degree-students/) might explore the Biological Systems Engineering program at UW–Madison, an undergraduate engineering degree elsewhere, or a graduate program in the College of Engineering.

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the *Guide*.

General Education
- Breadth—Humanities/Literature/Arts: 6 credits
- Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- Breadth—Social Studies: 3 credits
- Communication Part A & Part B *
- Ethnic Studies *
- Quantitative Reasoning Part A & Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

NUCLEAR ENGINEERING CURRICULUM

The nuclear engineering curriculum is divided into two focus areas, one emphasizing nuclear power and one emphasizing medical and other non-power applications of radiation sciences. The power focus area is more appropriate for students seeking careers in the nuclear power industry, while the radiation sciences focus area is better suited for students interested in medical and non-power applications.

POWER FOCUS AREA CURRICULUM

The following curriculum applies to students who entered the program starting in Fall 2020.

SUMMARY OF REQUIREMENTS

Code	Title	Credits
Mathematics and Statistics		22
Science		13
Engineering Science		31
Nuclear Engineering Core		28
Nuclear Engineering Electives		8
Introduction to Engineering		3
Communication Skills		8
Liberal Studies		16
Total Credits		**129**

MATHEMATICS AND STATISTICS

Code	Title	Credits
MATH 221	Calculus and Analytic Geometry 1	5
or MATH 217	Calculus with Algebra and Trigonometry II	
or MATH 275	Topics in Calculus I	
MATH 222	Calculus and Analytic Geometry 2	4
or MATH 276	Topics in Calculus II	
MATH 234	Calculus--Functions of Several Variables	4
MATH 320	Linear Algebra and Differential Equations	3
MATH 321	Applied Mathematical Analysis	3
STAT 324	Introductory Applied Statistics for Engineers	3
Total Credits		**22**

SCIENCE

Code	Title	Credits
Select one of the following:		5-9
CHEM 109	Advanced General Chemistry	
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	
PHYSICS 202	General Physics	5
or PHYSICS 208	General Physics	
PHYSICS 241	Introduction to Modern Physics	3
or PHYSICS 205	Modern Physics for Engineers	
Total Credits		**13-17**

ENGINEERING SCIENCE

Code	Title	Credits
E M A 201	Statics	3
E M A 202	Dynamics	3
or M E 240	Dynamics	
E M A 303	Mechanics of Materials	3
or M E 306	Mechanics of Materials	
E P 271	Engineering Problem Solving I	3
or COMP SCI 310	Problem Solving Using Computers	
M S & E 350	Introduction to Materials Science	3
M E 231	Geometric Modeling for Design and Manufacturing	3
M E 361	Thermodynamics	3
Select one of the following:		4-6
CBE 320	Introductory Transport Phenomena	
M E 363 & M E 364	Fluid Dynamics and Elementary Heat Transfer	
E C E 376	Electrical and Electronic Circuits [1]	3
Computing Elective (select one of the following):		3
COMP SCI 300	Programming II	
COMP SCI 412	Introduction to Numerical Methods	
E M A/E P 471	Intermediate Problem Solving for Engineers	
E M A/E P 476	Introduction to Scientific Computing for Engineering Physics	
Total Credits		**31-33**

[1] PHYSICS 321 Electric Circuits and Electronics is an acceptable substitute for E C E 376 Electrical and Electronic Circuits.

NUCLEAR ENGINEERING CORE

Code	Title	Credits
N E 305	Fundamentals of Nuclear Engineering	3
N E 405	Nuclear Reactor Theory	3
N E 408	Ionizing Radiation	3
N E 411	Nuclear Reactor Engineering	3
N E 412	Nuclear Reactor Design	5
N E/M S & E 423	Nuclear Engineering Materials	3
N E 424	Nuclear Materials Laboratory	1
N E 427	Nuclear Instrumentation Laboratory	2
N E 428	Nuclear Reactor Laboratory	2
N E 571	Economic and Environmental Aspects of Nuclear Energy	3
Total Credits		**28**

NUCLEAR ENGINEERING ELECTIVES

Code	Title	Credits
Technical Electives (not to be confused with Nuclear Engineering Electives or Medical Physics Electives) choose 2 credits from:		*2*
N E 1	Cooperative Education Program (no more than 3 credits)	
300+ level courses in the CoE except for E P D/ INTEREGR		
300+ level courses in MATH, PHYSICS, COMP SCI, STAT (except STAT 301), ASTRON, MED PHYS, and CHEM departments		
Nuclear Engineering Electives		*6*
Select credits from Nuclear Engineering Electives Course List below		
Total Credits		**8**

Nuclear Engineering Electives Course List [1]

Code	Title	Credits
N E 234	Principles and Practice of Nuclear Reactor Operations	4
N E 406	Nuclear Reactor Analysis	3
N E/M S & E 433	Principles of Corrosion	3
N E/MED PHYS 506	Monte Carlo Radiation Transport	3
M E/N E 520	Two-Phase Flow and Heat Transfer	3
N E/E C E/ PHYSICS 525	Introduction to Plasmas	3
N E 536	Feasibility St of Power from Controlled Thermonuclear Fusion	3
N E 541	Radiation Damage in Metals	3
N E 545	Materials Degradation in Advanced Nuclear Reactor Environments	3

N E 550	Advanced Nuclear Power Engineering	3
N E 555	Nuclear Reactor Dynamics	3
N E/M E 565	Power Plant Technology	3
N E/MED PHYS 569	Health Physics and Biological Effects	3-4
N E/I SY E 574	Methods for Probabilistic Risk Analysis of Nuclear Power Plants	3
N E 602	Special Topics in Reactor Engineering	3

Students are encouraged to access the online N E future course offering grid to plan their future course schedules and to confirm the offering of a course in the table.

[1] Courses meeting the Nuclear Engineering Electives requirement are all N E courses numbered above 200 that are not part of the required curriculum. No more than 3 credits of N E 699 Advanced Independent Study may be used to meet this requirement. (Refer to the NE handbook under Degree Information on the NE department website (https://www.engr.wisc.edu/department/engineering-physics/academics/bs-nuclear-engineering/)).

INTRODUCTION TO ENGINEERING

Code	Title	Credits
INTEREGR 170	Design Practicum	3
Total Credits		**3**

COMMUNICATION SKILLS

Code	Title	Credits
ENGL 100	Introduction to College Composition	3
or LSC 100	Science and Storytelling	
or COM ARTS 100	Introduction to Speech Composition	
or ESL 118	Academic Writing II	
E P D 275	Technical Presentations	2
INTEREGR 397	Engineering Communication (was EPD 397 before Fall 2020)	3
Total Credits		**8**

LIBERAL STUDIES ELECTIVES

Code	Title	Credits
College of Engineering Liberal Studies Requirements		
Complete Requirements (http://guide.wisc.edu/undergraduate/engineering/#requirementstext) [1]		16
Total Credits		**16**

[1] Students must take 16 credits that carry H, S, L, or Z breadth designators. These credits must fulfill the following subrequirements:

1. A minimum of two courses from the same department or program. At least one of these two courses must be designated as above the elementary level (I, A, or D) in the course listing.
2. A minimum of 6 credits designated as humanities (H, L, or Z in the course listing), and an additional minimum of 3 credits designated as social science (S or Z in the course listing). Foreign language courses count as H credits. Retroactive credits for language courses may not be used to meet the Liberal Studies credit requirement (they can be used for subrequirement 1 above).
3. At least 3 credits in courses designated as ethnic studies (lower case "e" in the course listing). These courses may help satisfy subrequirements 1 and 2 above, but they only count once toward the total required. Note: Some courses may have "e" designation but not have H, S, L, or Z designation; these courses do not count toward the Liberal Studies requirement.

For information on credit load, adding or dropping courses, course substitutions, pass/fail, auditing courses, dean's honor list, repeating courses, probation, and graduation, see the College of Engineering Official Regulations (http://guide.wisc.edu/undergraduate/engineering/#policiesandregulationstext).

RADIATION SCIENCES FOCUS AREA CURRICULUM

The following curriculum applies to students who entered the program starting in Fall 2020. Students wishing to select the Radiation Sciences focus area must have a 3.0 GPA and should send an email to the department Chair, Paul Wilson, chair@ep.wisc.edu including a copy of their transcript to show that they meet the GPA requirement and stating that they desire to declare the Radiation Sciences focus area; they should copy their academic advisor. Until this is done, the Power focus area is assumed.

SUMMARY OF REQUIREMENTS

Code	Title	Credits
Mathematics and Statistics		22
Science		16
Engineering Science		28
Nuclear Engineering Core Requirement		24
Radiation Sciences Electives		11
Introduction to Engineering		3
Communication Skills		8
Liberal Studies		16
Free Elective		1
Total Credits		**129**

MATHEMATICS AND STATISTICS

Code	Title	Credits
MATH 221	Calculus and Analytic Geometry 1	5
or MATH 217	Calculus with Algebra and Trigonometry II	
or MATH 275	Topics in Calculus I	
MATH 222	Calculus and Analytic Geometry 2	4
or MATH 276	Topics in Calculus II	
MATH 234	Calculus--Functions of Several Variables	4
MATH 320	Linear Algebra and Differential Equations	3
MATH 321	Applied Mathematical Analysis	3
STAT 324	Introductory Applied Statistics for Engineers	3
Total Credits		**22**

SCIENCE

Code	Title	Credits
Select one of the following:		5-10
CHEM 109	Advanced General Chemistry	
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	
PHYSICS 202	General Physics	5

or PHYSICS 208	General Physics	
PHYSICS 241	Introduction to Modern Physics	3
or PHYSICS 205	Modern Physics for Engineers	
PHYSICS 322	Electromagnetic Fields	3
Total Credits		**16-21**

ENGINEERING SCIENCE

Code	Title	Credits
E C E 376	Electrical and Electronic Circuits	3
or PHYSICS 321	Electric Circuits and Electronics	
E M A 201	Statics	3
E M A 202	Dynamics	3
or M E 240	Dynamics	
E M A 303	Mechanics of Materials	3
or M E 306	Mechanics of Materials	
E P 271	Engineering Problem Solving I	3
or COMP SCI 310	Problem Solving Using Computers	
M E 231	Geometric Modeling for Design and Manufacturing	3
M E 361	Thermodynamics	3
M S & E 350	Introduction to Materials Science	3
N E 424	Nuclear Materials Laboratory	1
Computing Elective (select one of the following):		3
COMP SCI 300	Programming II	
COMP SCI 412	Introduction to Numerical Methods	
E M A/E P 471	Intermediate Problem Solving for Engineers	
E M A/E P 476	Introduction to Scientific Computing for Engineering Physics	
Total Credits		**28**

NUCLEAR ENGINEERING CORE REQUIREMENT

Code	Title	Credits
Radiation Sciences Core		
N E 305	Fundamentals of Nuclear Engineering	3
N E 405	Nuclear Reactor Theory	3
N E 408	Ionizing Radiation	3
N E 412	Nuclear Reactor Design	5
N E 427	Nuclear Instrumentation Laboratory	2
N E 428	Nuclear Reactor Laboratory	2
MED PHYS/ B M E/H ONCOL/ PHYSICS 501	Radiation Physics and Dosimetry	3
N E 571	Economic and Environmental Aspects of Nuclear Energy	3
Total Credits		**24**

RADIATION SCIENCES ELECTIVES

Code	Title	Credits
Technical Electives (not to be confused with Nuclear Engineering Electives or Medical Physics Electives) choose 2 credits from:		*2*
N E 1	Cooperative Education Program (no more than 3 credits)	
300+ level courses in the CoE except for E P D/ INTEREGR		
300+ level courses in MATH, PHYSICS, COMP SCI, STAT (except STAT 301), ASTRON, MED PHYS and CHEM departments		
Medical Physics Electives		*9*
Select credits from Medical Physics Electives Course List below		
Total Credits		**11**

Medical Physics Electives Course List [1]

Code	Title	Credits
MED PHYS/ B M E 566	Physics of Radiotherapy	3
MED PHYS/N E 569	Health Physics and Biological Effects [2]	3-4
MED PHYS/ B M E 573	Medical Image Science: Mathematical and Conceptual Foundations	3
MED PHYS/ B M E 574	Imaging in Medicine: Applications	3
MED PHYS/ B M E 578	Non-Ionizing Diagnostic Imaging	4
MED PHYS/ B M E 580	The Physics of Medical Imaging with Ionizing Radiation	4
MED PHYS/ PHYSICS 588	Radiation Production and Detection	4
MED PHYS 671	Selected Topics in Medical Physics [2]	1-4
MED PHYS 701	Ethics and the responsible conduct of research and practice of Medical Physics	1

Students are encouraged to access the online N E future course offering grid to plan their future course schedules and to confirm the offering of a course in the table.

1 Courses meeting the Medical Physics Electives requirement are MED PHYS courses numbered 500 and above and selected PHYSICS courses at or above the 400 level. No more than 3 credits of N E 699 Advanced Independent Study may be used to meet this requirement. (Refer to the NE handbook under Degree Information on the NE department website (https://www.engr.wisc.edu/department/engineering-physics/academics/bs-nuclear-engineering/).)

2 N E/MED PHYS 569 Health Physics and Biological Effects and MED PHYS 671 Selected Topics in Medical Physics are especially recommended for students in this focus area.

INTRODUCTION TO ENGINEERING

Code	Title	Credits
INTEREGR 170	Design Practicum	3
Total Credits		**3**

COMMUNICATION SKILLS

Code	Title	Credits
ENGL 100	Introduction to College Composition	3
or LSC 100	Science and Storytelling	
or COM ARTS 100	Introduction to Speech Composition	
or ESL 118	Academic Writing II	
E P D 275	Technical Presentations	2
INTEREGR 397	Engineering Communication (was EPD 397 before Fall 2020)	3
Total Credits		**8**

LIBERAL STUDIES ELECTIVES

Code	Title	Credits
College of Engineering Liberal Studies Requirements		
Complete Requirements (http://guide.wisc.edu/undergraduate/engineering/#requirementstext) [1]		16
Total Credits		**16**

[1] Students must take 16 credits that carry H, S, L, or Z breadth designators. These credits must fulfill the following subrequirements:

1. A minimum of two courses from the same department or program. At least one of these two courses must be designated as above the elementary level (I, A, or D) in the course listing.
2. A minimum of 6 credits designated as humanities (H, L, or Z in the course listing), and an additional minimum of 3 credits designated as social science (S or Z in the course listing). Foreign language courses count as H credits. Retroactive credits for language courses may not be used to meet the Liberal Studies credit requirement (they can be used for subrequirement 1 above).
3. At least 3 credits in courses designated as ethnic studies (lower case "e" in the course listing). These courses may help satisfy subrequirements 1 and 2 above, but they only count once toward the total required. *Note:* Some courses may have "e" designation but not have H, S, L, or Z designation; these courses do not count toward the Liberal Studies requirement.

For information on credit load, adding or dropping courses, course substitutions, pass/fail, auditing courses, dean's honor list, repeating courses, probation, and graduation, see the College of Engineering Official Regulations (http://guide.wisc.edu/undergraduate/engineering/#policiesandregulationstext).

HONORS IN UNDERGRADUATE RESEARCH PROGRAM

Qualified undergraduates may earn an Honor in Research designation on their transcript and diploma by completing 8 credits of undergraduate honors research, including a senior thesis. Further information is available in the department office.

UNIVERSITY DEGREE REQUIREMENTS

Total Degree	To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency	Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.
Quality of Work	Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

LEARNING OUTCOMES

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

FOUR-YEAR PLAN

POWER FOCUS AREA IN NUCLEAR ENGINEERING

SAMPLE FOUR-YEAR PLAN

First Year

Fall	Credits	Spring	Credits
CHEM 109[1]	5	E M A 201[3]	3
MATH 221	5	MATH 222	4
Communication A	3	M E 231	3
INTEREGR 170[2]	3	M S & E 350	3
		Liberal Studies Elective	3
	16		**16**

Second Year

Fall	Credits	Spring	Credits
MATH 234	4	MATH 320	3
PHYSICS 202	5	PHYSICS 241 or 205	3
E M A 202[4]	3	M E 361	3

E P 271 or COMP SCI 310	3	E M A 303[4]	3
E P D 275 or COM ARTS 105	2	N E 424	1
		Liberal Studies Elective	3
	17		**16**

Third Year

Fall	Credits	Spring	Credits
N E 305	3	N E 405	3
MATH 321	3	N E 408	3
STAT 324[5]	3	CBE 320[6]	4
Technical Elective	2	Computing Elective	3
Liberal Studies Elective	4	E C E 376	3
	15		**16**

Fourth Year

Fall	Credits	Spring	Credits
N E 411	3	N E 412	5
N E 427	2	N E 428	2
N E/M S & E 423	3	N E 571	3
Nuclear Engineering Elective	3	Nuclear Engineering Elective	3
Liberal Studies Elective	3	Liberal Studies Elective	3
INTEREGR 397 (was EPD 397)	3		
	17		**16**

Total Credits 129

1. It is recommended that students take CHEM 109 Advanced General Chemistry for 5 credits. However, depending on their high school chemistry experience, students may substitute CHEM 103 General Chemistry I and CHEM 104 General Chemistry II for a total of 9 credits. Three credits of CHEM 103/CHEM 104 may be counted towards Technical Electives credits.
2. Students who were not able to take INTEREGR 170 Design Practicum as freshmen may, with the approval of their advisor, substitute a course offered in the College of Engineering or in the Departments of Chemistry, Computer Sciences, Mathematics, and Physics.
3. Students may substitute PHYSICS 201 General Physics, 5 credits, for E M A 201 Statics, 3 credits, with the approval of their advisor.
4. After completing E M A 201 Statics, students may take E M A 202 Dynamics and E M A 303 Mechanics of Materials in either order or concurrently.
5. STAT 311 Introduction to Theory and Methods of Mathematical Statistics I or STAT/M E 424 Statistical Experimental Design are acceptable substitutes.
6. M E 363 Fluid Dynamics and M E 364 Elementary Heat Transfer are acceptable substitutions for CBE 320 Introductory Transport Phenomena.

RADIATION SCIENCES FOCUS AREA IN NUCLEAR ENGINEERING

SAMPLE FOUR YEAR PLAN

First Year

Fall	Credits	Spring	Credits
CHEM 109[1]	5	E M A 201[3]	3
MATH 221	5	MATH 222	4
Communication A	3	M E 231	3
INTEREGR 170[2]	3	M S & E 350	3
		Liberal Studies Elective	3
	16		**16**

Second Year

Fall	Credits	Spring	Credits
MATH 234	4	MATH 320	3
PHYSICS 202	5	PHYSICS 241 or 205	3
E M A 202[4]	3	M E 361	3
E P 271 or COMP SCI 310	3	E M A 303[4]	3
E P D 275 or COM ARTS 105	2	N E 424	1
		Liberal Studies Elective	3
	17		**16**

Third Year

Fall	Credits	Spring	Credits
N E 305	3	N E 405	3
MATH 321	3	N E 408	3
STAT 324[5]	3	PHYSICS 322	3
Technical Elective[6]	2	Computing Elective	3
Liberal Studies Elective	4	E C E 376 or PHYSICS 321	3
		Free Elective	1
	15		**16**

Fourth Year

Fall	Credits	Spring	Credits
N E 427	2	N E 412	5
MED PHYS/B M E/ H ONCOL/PHYSICS 501	3	N E 571	3
Medical Physics Elective	3	N E 428	2
Medical Physics Elective	3	Medical Physics Elective	3
Liberal Studies Elective	3	Liberal Studies Elective	3
INTEREGR 397 (was EPD 397)	3		
	17		**16**

Total Credits 129

1. It is recommended that students take CHEM 109 Advanced General Chemistry for 5 credits. However, depending on their high school chemistry experience, students may substitute this with CHEM 103 General Chemistry I and CHEM 104 General Chemistry II for a total of 9 credits. Three credits of CHEM 103/CHEM 104 may be counted as Technical Electives credits.
2. Students who were not able to take INTEREGR 170 Design Practicum as freshmen may, with the approval of their advisor, substitute a

course offered in the College of Engineering or in the Departments of Chemistry, Computer Science, Mathematics, and Physics.

3 Students may substitute PHYSICS 201 General Physics, 5 credits, for E M A 201 Statics, 3 credits, with the approval of their advisor.

4 After completing E M A 201 Statics, students may complete E M A 202 Dynamics and E M A 303 Mechanics of Materials in either order or concurrently.

5 STAT 311 Introduction to Theory and Methods of Mathematical Statistics I or STAT/M E 424 Statistical Experimental Design are acceptable substitutes.

6 PHYSICS 623 Electronic Aids to Measurement is recommended for students in the Radiation Sciences focus area.

ADVISING AND CAREERS

ADVISING

Each College of Engineering program has academic advisors dedicated to serving its students. Program advisors can help current College of Engineering students with questions about accessing courses, navigating degree requirements, resolving academic issues and more. Students can find their assigned advisor on the homepage of their student center.

Continuing students who have fulfilled the progression requirements will also be assigned a Nuclear Engineering faculty advisor. Before enrolling in courses each semester, students must meet with their faculty advisor for assistance in planning courses and reviewing degree requirements. Faculty advisors are a valuable resource, as they can provide students with in-depth guidance on course content, internship and job opportunities, research, and more.

ENGINEERING CAREER SERVICES

Engineering Career Services (ECS) assists students in identifying pre-professional work-based learning experiences such as co-ops and summer internships, considering and applying to graduate or professional school, and finding full-time professional employment during their graduation year.

ECS offers two major career fairs per year, assists with resume writing and interviewing skills, hosts workshops on the job search, and meets one-on-one with students to discuss offer negotiations.

Students are encouraged to utilize the ECS office early in their academic careers. For comprehensive information on ECS programs and workshops, see the ECS website or call 608-262-3471.

PEOPLE

PROFESSORS

Paul Wilson (Chair)
Riccardo Bonazza
Curt A. Bronkhorst
Wendy Crone
Adrien Couet
Chris Hegna
Douglass Henderson
Roderic Lakes
Oliver Schmitz
Carl Sovinec
Kumar Sridharan
Fabian Waleffe

ASSISTANT PROFESSORS

Jennifer Choy
Stephanie Diem
Jennifer Franck
Benedikt Geiger
Ben Lindley
Jacob Notbohm
Ramathasan Thevamaran
Yongfeng Zhang

See also Engineering Physics Faculty Directory (https://directory.engr.wisc.edu/ep/faculty/).

RESOURCES AND SCHOLARSHIPS

FACILITIES

Facilities available for instruction and research include:

Nuclear Reactor Laboratory
Nuclear Instrumentation Laboratory
Fluid Mechanics and Heat Transfer Laboratories
Plasma Physics Laboratories
Superconductivity and Cryogenics Laboratories
Instructional Computing Labs (in Computer Aided Engineering)

SCHOLARSHIPS

Most financial assistance is awarded through the Office of Student Financial Aid (333 E. Campus Mall RM 9701, 262-3060). Some financial assistance is also available from the College of Engineering. Please see your academic advisor or Student Services Center, 1410 Engineering Drive, for more information. The Department has a limited amount of scholarship funds that are awarded on a merit basis, usually at the beginning of the fall semester. An application for departmental scholarships is not necessary; all students are automatically considered in the competition for departmental scholarships.

ACCREDITATION

Accreditation.

Accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org (http://www.abet.org/).

Note: Undergraduate Program Educational Objectives and Student Outcomes are made publicly available at the Departmental website. (In this Guide, the program's Student Outcomes are designated by our campus as "Learning Outcomes.")