Nuclear Engineering

Bachelor of Science (BS)

The program is designed to prepare students for a career in industry, the national laboratories, or in state or federal regulatory agencies. The program, leading to a Bachelor of Science (BS) degree in Nuclear Engineering, emphasizes study in the following areas of nuclear engineering: nuclear reactions and radiation, introduction to medical imaging, nuclear reactor theory and design, fusion power engineering, radioactive waste management, radiological and biophysics, and nuclear materials.

Many students will go on to complete a one-year master's degree program (the department does not have a fifth-year MS program). Students interested in careers in scientific research or in college-level teaching go on to complete the doctorate.

Accreditation

This program is accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org/).

Admission to the Major

Prospective undergraduates to the College of Engineering will apply for admission to a specific program in the College. For further information, please see the College of Engineering's website (http://coe.berkeley.edu/students/prospective-students/admissions.html).

Admission to Engineering via a Change of College application for current UC Berkeley students is highly unlikely and very competitive as there are few, if any, spaces that open in the College each year to students admitted to other colleges at UC Berkeley. For further information regarding a Change of College to Engineering, please see the College's website (http://coe.berkeley.edu/students/current-undergraduates/change-of-college/).

Minor Program

The department offers a minor in Nuclear Engineering (NE) that is open to all students who are not majoring in NE and who have completed the necessary prerequisites for the minor requirements. For information regarding the prerequisites, please see the Minor Requirements tab on this page.

The Nuclear Engineering (NE) minor is open to any undergraduate who satisfies the following requirements:

- Declaration of a major (not NE) on the UC Berkeley campus
- A cumulative GPA of at least 3.0 at the time of applying
- Completion of the minor must not delay graduation

To apply for the minor, submit the Petition for Admission to the Undergraduate Minor (http://coenuc.wpengine.com/wp-content/uploads/2019/04/UG-Admission-to-minor-in-NE.pdf) to the undergraduate adviser after completion of the prerequisite courses. Upon completion of the minor requirements, submit a Petition for Completion of the Undergraduate Minor (http://coenuc.wpengine.com/wp-content/uploads/2019/04/UG-Completion-of-minor-in-NE-2.pdf) to the undergraduate adviser.

Joint Majors

The Department of Nuclear Engineering also offers three joint majors with other departments in the College of Engineering and one joint major with a Department in the College of Chemistry. For further information on these programs, please click the links below:
Chemical Engineering/Nuclear Engineering (http://guide.berkeley.edu/undergraduate/degree-programs/chemical-engineering-nuclear-joint-major/) (Department of Chemical and Biomolecular Engineering, College of Chemistry)
Electrical Engineering and Computer Sciences/Nuclear Engineering (http://guide.berkeley.edu/undergraduate/degree-programs/electrical-engineering-computer-sciences-nuclear-joint-major/) (Department of Electrical Engineering and Computer Sciences)
Materials Science and Engineering/Nuclear Engineering (http://guide.berkeley.edu/undergraduate/degree-programs/materials-science-engineering-nuclear-joint-major/) (Department of Materials Science and Engineering)
Mechanical Engineering/Nuclear Engineering (http://guide.berkeley.edu/undergraduate/degree-programs/mechanical-engineering-nuclear/) (Department of Mechanical Engineering)

In addition to the University, campus, and college requirements, students must fulfill the below requirements specific to their major program.

General Guidelines

1. All technical courses taken in satisfaction of major requirements must be taken for a letter grade.
2. No more than one upper division course may be used to simultaneously fulfill requirements for a student’s major and minor programs.
3. A minimum overall grade point average (GPA) of 2.0 is required for all work undertaken at UC Berkeley.
4. A minimum GPA of 2.0 is required for all technical courses taken in satisfaction of major requirements.

For information regarding residence requirements and unit requirements, please see the College Requirements tab.

For a detailed plan of study by year and semester, please see the Plan of Study tab.

Lower Division Requirements

MATH 1A	Calculus	4
MATH 1B	Calculus	4
MATH 53	Multivariable Calculus	4
MATH 54	Linear Algebra and Differential Equations	4
CHEM 1A & 1AL	General Chemistry and General Chemistry Laboratory [1]	5
or CHEM 4A	General Chemistry and Quantitative Analysis	
PHYSICS 7A	Physics for Scientists and Engineers	4
PHYSICS 7B	Physics for Scientists and Engineers	4
PHYSICS 7C	Physics for Scientists and Engineers	4
EECS 16A	Designing Information Devices and Systems I	3-4
or ENGIN 11	A Hands-on Introduction to Radiation Detection: Getting to know our Radioactive World	
or MEC ENG 100	Electronics for the Internet of Things	

or PHYSICS 111A	Instrumentation Laboratory	
ENGIN 7	Introduction to Computer Programming for Scientists and Engineers	4
ENGIN 40	Engineering Thermodynamics	4
MAT SCI 45 & 45L	Properties of Materials and Properties of Materials Laboratory	4
Any freshman seminar		1

[1] CHEM 4A is intended for students majoring in chemistry or a closely-related field.

Upper Division Requirements

ENGIN 117	Methods of Engineering Analysis	3
NUC ENG 100	Introduction to Nuclear Energy and Technology	3
NUC ENG 101	Nuclear Reactions and Radiation	4
NUC ENG 104	Radiation Detection and Nuclear Instrumentation Laboratory	4
NUC ENG 150	Introduction to Nuclear Reactor Theory	4
NUC ENG 170A	Nuclear Design: Design in Nuclear Power Technology and Instrumentation	3
Ethics Requirement [2]		3-4
Technical Electives: Minimum 29 units (see list below) [3,4,5]		29
Must include at least 17 units of upper division NUC ENG courses		
The remaining 12 technical elective units must be fulfilled by taking courses in engineering and science of which a minimum of 9 units must be upper division.		

Upper Division Technical Electives

The following groups of electives should help undergraduate students focus their choices on specific professional goals. The electives selected need not be from any single group.

Beam and Accelerator Applications		
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
NUC ENG 180	Introduction to Controlled Fusion	3
PHYSICS 110A	Electromagnetism and Optics	4
or EL ENG 117	Electromagnetic Fields and Waves	
PHYSICS 110B	Electromagnetism and Optics	4
or EL ENG 117	Electromagnetic Fields and Waves	
PHYSICS 129	Particle Physics	4
PHYSICS 139	Special Relativity and General Relativity	3
PHYSICS 142	Introduction to Plasma Physics	4
Bionuclear Engineering		
BIO ENG C165	Medical Imaging Signals and Systems	4
EL ENG 120	Signals and Systems	4
EL ENG C145B	Medical Imaging Signals and Systems	4
NUC ENG 107	Introduction to Imaging	3
NUC ENG 162	Radiation Biophysics and Dosimetry	3
Computational Methods		
COMPSCI 169	Software Engineering	4
MATH 104	Introduction to Analysis	4
MATH 110	Linear Algebra	4
MATH 128A	Numerical Analysis	4
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
STAT 134	Concepts of Probability	4
STAT 150	Stochastic Processes	3
Fission Power Engineering		
MEC ENG 106	Fluid Mechanics	3-4
or CHM ENG 150A	Transport Processes	
MEC ENG 109	Heat Transfer	3-4
or CHM ENG 150A	Transport Processes	
NUC ENG 120	Nuclear Materials	4
NUC ENG 124	Radioactive Waste Management	3
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
NUC ENG 161	Nuclear Power Engineering	4
NUC ENG 167	Risk-Informed Design for Advanced Nuclear Systems	3
NUC ENG 175	Methods of Risk Analysis	3
Fusion Power Engineering		
NUC ENG 120	Nuclear Materials	4
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
NUC ENG 180	Introduction to Controlled Fusion	3
PHYSICS 110A	Electromagnetism and Optics	4
PHYSICS 110B	Electromagnetism and Optics	4
PHYSICS 142	Introduction to Plasma Physics	4
Homeland Security and Nonproliferation		
CHEM 143	Nuclear Chemistry	2
NUC ENG 102	Nuclear Reactions and Radiation Laboratory	3
NUC ENG 107	Introduction to Imaging	3
NUC ENG 130	Analytical Methods for Non-proliferation	3
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
NUC ENG 175	Methods of Risk Analysis	3
PHYSICS 110A	Electromagnetism and Optics	4
PHYSICS 110B	Electromagnetism and Optics	4
PHYSICS 111A	Instrumentation Laboratory	4
PHYSICS 111B	Advanced Experimentation Laboratory	1-3
Materials in Nuclear Technology		
MAT SCI 102	Bonding, Crystallography, and Crystal Defects	3
MAT SCI 104	Materials Characterization	3
MAT SCI 112	Corrosion (Chemical Properties)	3
MAT SCI 113	Mechanical Behavior of Engineering Materials	3
NUC ENG 120	Nuclear Materials	4
NUC ENG 124	Radioactive Waste Management	3
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
NUC ENG 161	Nuclear Power Engineering	4
Nuclear Fuel Cycles and Waste Management		
CHM ENG 150A	Transport Processes	4
CHM ENG 150B	Transport and Separation Processes	4
ENGIN 120	Principles of Engineering Economics	3
MAT SCI 112	Corrosion (Chemical Properties)	3
NUC ENG 120	Nuclear Materials	4

NUC ENG 124	Radioactive Waste Management	3
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
NUC ENG 161	Nuclear Power Engineering	4
NUC ENG 175	Methods of Risk Analysis	3
Radiation and Health Physics		
NUC ENG 102	Nuclear Reactions and Radiation Laboratory	3
NUC ENG 120	Nuclear Materials	4
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
NUC ENG 162	Radiation Biophysics and Dosimetry	3
NUC ENG 180	Introduction to Controlled Fusion	3
Risk, Safety and Systems Analysis		
CIV ENG 193	Engineering Risk Analysis	3
CHM ENG 150A	Transport Processes	4
ENGIN 120	Principles of Engineering Economics	3
IND ENG 166	Decision Analytics	3
NUC ENG 120	Nuclear Materials	4
NUC ENG 124	Radioactive Waste Management	3
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport	3
NUC ENG 161	Nuclear Power Engineering	4
NUC ENG 167	Risk-Informed Design for Advanced Nuclear Systems	3
NUC ENG 175	Methods of Risk Analysis	3

1 CHEM 4A is intended for students majoring in chemistry or a closely-related field.

2 Students must take one course with ethics content. This may be fulfilled within the Humanities/Social Sciences requirement by taking one of the following courses: ANTHRO 156B, BIO ENG 100, ENGIN 125, ENGIN 157AC, ENGIN 185, ESPM 161, ESPM 162, GEOG 31, IAS 157AC, ISF 100E, L & S 160B, PHILOS 2, PHILOS 104, PHILOS 107, and SOCIOL 116.

3 Students admitted as freshmen must complete 29 technical elective units which must include at least 17 units of upper division nuclear engineering courses. The remaining 12 technical elective units must be fulfilled by taking courses in engineering and science, of which a minimum of 9 units must be upper division. Students must consult with and obtain approval from their faculty adviser no later than the fall semester of their junior year for their choices of technical elective courses. Students may receive up to 3 units of technical elective credit for graded research in H194 or 196.

4 Junior transfer admits must complete 26 technical elective units (instead of 29) which must include at least 14 units of upper division nuclear engineering courses. The remaining 12 technical elective units must be fulfilled by taking courses in engineering and science, of which a minimum of 9 units must be upper division. Students must consult with and obtain approval from their faculty adviser no later than the fall semester of their junior year for their choices of technical elective courses. Students may receive up to three units of technical elective credit for graded research in H194 or 196.

5 Technical Electives cannot include:

- Any course taken on a *Pass/No Pass* basis
- Any course that counts as H/SS
- Courses numbered 24, 39, 84, 88
- Any of the following courses: BIOENG 100, 153; COMPSCI C79; DESINV courses (except DES INV 15, DES INV 22, DES INV 23, DES INV 90E, DES INV 190E); ENGIN 125, 157AC, 180, 185, 187; INDENG 95, 172, 185, 186, 190 series, 191, 192, 195; MECENG 126, 191AC, 190K, 191K.

Minor programs are areas of concentration requiring fewer courses than an undergraduate major. These programs are optional but can provide depth and breadth to a UC Berkeley education. The College of Engineering does not offer additional time to complete a minor, but it is usually possible to finish within the allotted time with careful course planning. Students are encouraged to meet with their ESS adviser to discuss the feasibility of completing a minor program.

All the engineering departments offer minors. Students may also consider pursuing a minor in another school or college.

General Guidelines

1. All minors must be declared no later than one semester before a student's Expected Graduation Term (EGT). If the semester before EGT is fall or spring, the deadline is the last day of RRR week. If the semester before EGT is summer, the deadline is the final Friday of Summer Sessions. To declare a minor, contact the department advisor for information on requirements, and the declaration process.
2. All courses taken to fulfill the minor requirements must be taken for graded credit.
3. A minimum overall grade point average (GPA) of 3.0 and a minimum GPA of 3.0 in the prerequisite courses is required for acceptance into the minor program.
4. A minimum grade point average (GPA) of 2.0 is required for courses used to fulfill the minor requirements.
5. No more than one upper division course may be used to simultaneously fulfill requirements for a student’s major and minor programs.
6. Completion of the minor program cannot delay a student’s graduation.

Lower Division Prerequisites

MATH 1A	Calculus	4
MATH 1B	Calculus	4
MATH 53	Multivariable Calculus	4
MATH 54	Linear Algebra and Differential Equations	4
PHYSICS 7A	Physics for Scientists and Engineers	4
PHYSICS 7B	Physics for Scientists and Engineers	4
PHYSICS 7C	Physics for Scientists and Engineers	4
ENGIN 45	Course Not Available	3

Upper Division Requirements

NUC ENG 100	Introduction to Nuclear Energy and Technology	3
Select three of the following:		9-12
NUC ENG 101	Nuclear Reactions and Radiation [4]	
NUC ENG 102	Nuclear Reactions and Radiation Laboratory [3]	
NUC ENG 104	Radiation Detection and Nuclear Instrumentation Laboratory [4]	
NUC ENG 107	Introduction to Imaging [3]	
NUC ENG 120	Nuclear Materials [4]	
NUC ENG 124	Radioactive Waste Management [3]	

NUC ENG 130	Analytical Methods for Non-proliferation [4]
NUC ENG 150	Introduction to Nuclear Reactor Theory [4]
NUC ENG 155	Introduction to Numerical Simulations in Radiation Transport [3]
NUC ENG 161	Nuclear Power Engineering [4]
NUC ENG 167	Risk-Informed Design for Advanced Nuclear Systems [3]
NUC ENG 170A	Nuclear Design: Design in Nuclear Power Technology and Instrumentation [3]
NUC ENG 170B	Nuclear Design: Design in Bionuclear, Nuclear Medicine, and Radiation Therapy [3]
NUC ENG 175	Methods of Risk Analysis [3]
NUC ENG 180	Introduction to Controlled Fusion [3]

Students in the College of Engineering must complete no fewer than 120 semester units with the following provisions:

1. Completion of the requirements of one engineering major program (https://engineering.berkeley.edu/students/undergraduate-guide/degree-requirements/major-programs/) of study.
2. A minimum overall grade point average of 2.00 (C average) and a minimum 2.00 grade point average in upper division technical coursework required of the major.
3. The final 30 units and two semesters must be completed in residence in the College of Engineering on the Berkeley campus.
4. All technical courses (math, science, and engineering) that can fulfill requirements for the student's major must be taken on a letter graded basis (unless they are only offered P/NP).
5. Entering freshmen are allowed a maximum of eight semesters to complete their degree requirements. Entering junior transfers are allowed five semesters to complete their degree requirements. Summer terms are optional and do not count toward the maximum. Students are responsible for planning and satisfactorily completing all graduation requirements within the maximum allowable semesters.
6. Adhere to all college policies and procedures (http://engineering.berkeley.edu/academics/undergraduate-guide/) as they complete degree requirements.
7. Complete the lower division program before enrolling in upper division engineering courses.

Humanities and Social Sciences (H/SS) Requirement

To promote a rich and varied educational experience outside of the technical requirements for each major, the College of Engineering has a six-course Humanities and Social Sciences breadth requirement (http://engineering.berkeley.edu/student-services/degree-requirements/humanities-and-social-sciences/), which must be completed to graduate. This requirement, built into all the engineering programs of study, includes two Reading and Composition courses (R&C), and four additional courses within which a number of specific conditions must be satisfied. See the humanities and social sciences (https://engineering.berkeley.edu/students/undergraduate-guide/degree-requirements/humanities-and-social-sciences/) section of our website for details.

Class Schedule Requirements

- Minimum units per semester: 12.0
- Maximum units per semester: 20.5
- Minimum technical courses: College of Engineering undergraduates must include at least two letter graded technical courses (of at least 3 units each) in their semester program. Every semester students are expected to make satisfactory progress in their declared major. Satisfactory progress is determined by the student's Engineering Student Services Advisor. (Note: For most majors, normal progress (https://engineering.berkeley.edu/academics/undergraduate-guide/policies-procedures/scholarship-progress/#ac12282) will require enrolling in 3-4 technical courses each semester). Students who are not in compliance with this policy by the end of the fifth week of the semester are subject to a registration block that will delay enrollment for the following semester.
- All technical courses (math, science, engineering) that satisfy requirements for the major must be taken on a letter-graded basis (unless only offered as P/NP).

Minimum Academic (Grade) Requirements

- Minimum overall and semester grade point averages of 2.00 (C average) are required of engineering undergraduates. Students will be subject to dismissal from the University if during any fall or spring semester their overall UC GPA falls below a 2.00, or their semester GPA is less than 2.00.
- Students must achieve a minimum grade point average of 2.00 (C average) in upper division technical courses required for the major curriculum each semester.
- A minimum overall grade point average of 2.00 and a minimum 2.00 grade point average in upper division technical course work required for the major are required to earn a Bachelor of Science in the College of Engineering.

Unit Requirements

To earn a Bachelor of Science in Engineering, students must complete at least 120 semester units of courses subject to certain guidelines:

- Completion of the requirements of one engineering major program (https://engineering.berkeley.edu/students/undergraduate-guide/degree-requirements/major-programs/) of study.
- A maximum of 16 units of special studies coursework (courses numbered 97, 98, 99, 197, 198, or 199) is allowed to count towards the B.S. degree, and no more than 4 units in any single term can be counted.
- A maximum of 4 units of physical education from any school attended will count towards the 120 units.
- Passed (P) grades may account for no more than one third of the total units completed at UC Berkeley, Fall Program for Freshmen (FPF), UC Education Abroad Program (UCEAP), or UC Berkeley Washington Program (UCDC) toward the 120 overall minimum unit requirement. Transfer credit is not factored into the limit. This includes transfer units from outside of the UC system, other UC campuses, credit-bearing exams, as well as UC Berkeley Extension XB units.

Normal Progress

Students in the College of Engineering must enroll in a full-time program and make normal progress (https://engineering.berkeley.edu/students/

undergraduate-guide/policies-procedures/scholarship-progress/#ac12282) each semester toward the bachelor's degree. The continued enrollment of students who fail to achieve minimum academic progress shall be subject to the approval of the dean. (Note: Students with official accommodations established by the Disabled Students' Program, with health or family issues, or with other reasons deemed appropriate by the dean may petition for an exception to normal progress rules.)

University of California Requirements

Entry Level Writing (https://www.ucop.edu/elwr/)

All students who will enter the University of California as freshmen must demonstrate their command of the English language by fulfilling the Entry Level Writing Requirement. Satisfaction of this requirement is also a prerequisite to enrollment in all Reading and Composition courses at UC Berkeley.

American History and American Institutions (http://guide.berkeley.edu/undergraduate/education/#universityrequirementstext)

The American History and Institutions requirements are based on the principle that a U.S. resident who has graduated from an American university should have an understanding of the history and governmental institutions of the United States.

Campus Requirement

American Cultures (http://guide.berkeley.edu/undergraduate/education/#campusrequirementstext)

The American Cultures requirement is a Berkeley campus requirement, one that all undergraduate students at Berkeley need to pass in order to graduate. You satisfy the requirement by passing, with a grade not lower than C- or P, an American Cultures course. You may take an American Cultures course any time during your undergraduate career at Berkeley. The requirement was instituted in 1991 to introduce students to the diverse cultures of the United States through a comparative framework. Courses are offered in more than fifty departments in many different disciplines at both the lower and upper division level.

The American Cultures requirement and courses constitute an approach that responds directly to the problem encountered in numerous disciplines of how better to present the diversity of American experience to the diversity of American students whom we now educate.

Faculty members from many departments teach American Cultures courses, but all courses have a common framework. The courses focus on themes or issues in United States history, society, or culture; address theoretical or analytical issues relevant to understanding race, culture, and ethnicity in American society; take substantial account of groups drawn from at least three of the following: African Americans, indigenous peoples of the United States, Asian Americans, Chicano/Latino Americans, and European Americans; and are integrative and comparative in that students study each group in the larger context of American society, history, or culture.

This is not an ethnic studies requirement, nor a Third World cultures requirement, nor an adjusted Western civilization requirement. These courses focus upon how the diversity of America's constituent cultural traditions have shaped and continue to shape American identity and experience.

Visit the Class Schedule (http://classes.berkeley.edu/) or the American Cultures website (http://americancultures.berkeley.edu/) for the specific American Cultures courses offered each semester. For a complete list of approved American Cultures courses at UC Berkeley and California Community Colleges, please see the American Cultures Subcommittee's website (https://academic-senate.berkeley.edu/committees/amcult/). See your academic adviser if you have questions about your responsibility to satisfy the American Cultures breadth requirement.

For more detailed information regarding the courses listed below (e.g., elective information, GPA requirements, etc.), please see the College Requirements and Major Requirements tabs.

			Freshman
	Fall Units		**Spring Units**
CHEM 4A or 1A ***and*** 1AL[1]	5	MATH 1B	4
MATH 1A	4	PHYSICS 7A	4
Reading & Composition Part A Course[7]	4	ENGIN 7	4
Humanities/Social Sciences course[7]	3-4	Reading & Composition Part B Course[7]	4
Any Freshman seminar	1		
	17-18		**16**
			Sophomore
	Fall Units		**Spring Units**
MATH 53	4	MATH 54	4
PHYSICS 7B	4	PHYSICS 7C	4
MAT SCI 45 & 45L	4	Electronic Circuits Elective[2]	3-4
Humanities/Social Sciences course[7]	3-4	Humanities/Social Sciences course[7]	3-4
	15-16		**14-16**
			Junior
	Fall Units		**Spring Units**
ENGIN 117	3	NUC ENG 101	4
ENGIN 40	4	NUC ENG 150	4
NUC ENG 100	3	Technical Elective[4,5,6]	4
Humanities/Social Sciences course (with Ethics content)[4,7]	3-4	Free Elective	1
	13-14		**13**
			Senior
	Fall Units		**Spring Units**
NUC ENG 104	4	NUC ENG 170A	3
Technical Electives[4,5,6]	12	Technical Electives[4,5,6]	13
	16		**16**

Total Units: 120-125

1. CHEM 4A is intended for students majoring in chemistry or a closely-related field.
2. Electronic Circuits Elective: Choose one course from EECS 16A, ENGIN 11, MEC ENG 100, or PHYSICS 111A.
3. Students must take one course with ethics content. This may be fulfilled within the Humanities/Social Sciences requirement by taking one of the following courses: ANTHRO 156B, BIO ENG 100, ENGIN 125, ENGIN 157AC, ENGIN 185, ESPM 161, ESPM 162, GEOG 31, IAS 157AC, ISF 100E, L & S 160B, PHILOS 2, PHILOS 104, PHILOS 107, and SOCIOL 116.

4 Students admitted as freshmen must complete 29 technical elective units which must include at least 17 units of upper division nuclear engineering courses. The remaining 12 technical elective units must be fulfilled by taking courses in engineering and science, of which a minimum of 9 units must be upper division. See Major Requirements tab for lists of suggested electives. Students must consult with and obtain approval from their faculty adviser no later than the fall semester of their junior year for their choices of technical elective courses. Students may receive up to three units of technical elective credit for graded research in H194 or 196.

5 Junior transfer admits must complete 26 (instead of 29) technical elective units which must include at least 14 units of upper division nuclear engineering courses. The remaining 12 technical elective units must be fulfilled by taking courses in engineering and science, of which a minimum of 9 units must be upper division. See Major Requirements tab for lists of suggested electives. Students must consult with and obtain approval from their faculty adviser no later than the fall semester of their junior year for their choices of technical elective courses. Students may receive up to three units of technical elective credit for graded research in H194 or 196.

6 Technical Electives cannot include:

- Any course taken on a *Pass/No Pass* basis
- Any course that counts as H/SS
- Courses numbered 24, 39, 84, 88
- Any of the following courses: BIOENG 100, 153; COMPSCI C79; DESINV courses (except DES INV 15, DES INV 22, DES INV 23, DES INV 90E, DES INV 190E); ENGIN 125, 157AC, 180, 185, 187; INDENG 95, 172, 185, 186, 190 series, 191, 192, 195; MECENG 191AC, 190K, 191K.

7 The Humanities/Social Sciences (H/SS) requirement includes two approved Reading & Composition (R&C) courses and four additional approved courses, with which a number of specific conditions must be satisfied. R&C courses must be taken for a letter grade (C- or better required). The first half (R&C Part A) must be completed by the end of the freshman year; the second half (R&C Part B) must be completed by no later than the end of the sophomore year. The remaining courses may be taken at any time during the program. See engineering.berkeley.edu/hss (https://engineering.berkeley.edu/academics/undergraduate-guide/degree-requirements/humanities-and-social-sciences/) for complete details and a list of approved courses.

Mission

The mission of the Department of Nuclear Engineering is to maintain and strengthen the University of California's only center of excellence in nuclear engineering education and research and to serve California and the nation by improving and applying nuclear science and technology. The mission of the undergraduate degree program in Nuclear Engineering is to prepare our students to begin a lifetime of technical achievement and professional leadership in academia, government, the national laboratories, and industry.

Learning Goals for the Major

The foundation of the UC Berkeley Nuclear Engineering (NE) program is a set of five key objectives for educating undergraduate students. The NE program continuously reviews these objectives internally to ensure that they meet the current needs of the students, and each spring the Program Advisory Committee meets to review the program and recommend changes to better serve students. The NE Program Advisory Committee was established in 1988 and is composed of senior leaders from industry, the national laboratories, and academia.

Nuclear engineering at UC Berkeley prepares undergraduate students for employment or advanced studies with four primary constituencies: industry, the national laboratories, state and federal agencies, and academia (graduate research programs). Graduate research programs are the dominant constituency. From 2000 to 2005, sixty-eight percent of graduating NE seniors indicated plans to attend graduate school in their senior exit surveys. To meet the needs of these constituencies, the objectives of the NE undergraduate program are to produce graduates who as practicing engineers and researchers do the following:

1. Apply solid knowledge of the fundamental mathematics and natural (both physical and biological) sciences that provide the foundation for engineering applications.
2. Demonstrate an understanding of nuclear processes, and the application of general natural science and engineering principles to the analysis and design of nuclear and related systems of current and/or future importance to society.
3. Exhibit strong, independent learning, analytical and problem solving skills, with special emphasis on design, communication, and an ability to work in teams.
4. Demonstrate an understanding of the broad social, ethical, safety, and environmental context within which nuclear engineering is practiced.
5. Value and practice life-long learning.

Major Maps help undergraduate students discover academic, co-curricular, and discovery opportunities at UC Berkeley based on intended major or field of interest. Developed by the Division of Undergraduate Education in collaboration with academic departments, these experience maps will help you:

- **Explore** your major and gain a better understanding of your field of study
- **Connect** with people and programs that inspire and sustain your creativity, drive, curiosity and success
- **Discover** opportunities for independent inquiry, enterprise, and creative expression
- **Engage** locally and globally to broaden your perspectives and change the world
- **Reflect** on your academic career and prepare for life after Berkeley

Use the major map below as a guide to planning your undergraduate journey and designing your own unique Berkeley experience.

View the Nuclear Engineering Major Map PDF. **(**https://vcue.berkeley.edu/sites/default/files/nuclear_engineering.pdf**)**

Nuclear Engineering

Expand all course descriptions [+]Collapse all course descriptions [-]

NUC ENG 10 What do nuclear engineers do? 1 Unit

Terms offered: Not yet offered
This seminar provides freshman and first year transfer students with an overview of the field of nuclear engineering (NE) and the research activities in the NE department. Every week a faculty member will introduce a topic and describe the main research challenges in that area.
What do nuclear engineers do?: Read More [+]
Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Instructor: Hosemann

What do nuclear engineers do?: Read Less [-]

NUC ENG 24 Freshman Seminars 1 Unit

Terms offered: Fall 2022, Spring 2022, Fall 2021
The Berkeley Seminar Program has been designed to provide new students with the opportunity to explore an intellectual topic with a faculty member in a small-seminar setting. Berkeley Seminars are offered in all campus departments, and topics vary from department to department and semester to semester.
Freshman Seminars: Read More [+]
Rules & Requirements

Repeat rules: Course may be repeated for credit when topic changes.

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of seminar per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: The grading option will be decided by the instructor when the class is offered. Final Exam To be decided by the instructor when the class is offered.

Freshman Seminars: Read Less [-]

NUC ENG 100 Introduction to Nuclear Energy and Technology 3 Units

Terms offered: Fall 2022, Fall 2021, Fall 2020
The class provides students with an overview of the contemporary nuclear energy technology with emphasis on nuclear fission as an energy source. Starting with the basic physics of the nuclear fission process, the class includes discussions on reactor control, thermal hydraulics, fuel production, and spent fuel management for various types of reactors in use around the world as well as analysis of safety and other nuclear-related issues. This class is intended for sophomore NE students, but is also open to transfer students and students from other majors.
Introduction to Nuclear Energy and Technology: Read More [+]
Rules & Requirements

Prerequisites: PHYSICS 7A, PHYSICS 7B, and MATH 53

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Fratoni

Introduction to Nuclear Energy and Technology: Read Less [-]

NUC ENG 101 Nuclear Reactions and Radiation 4 Units

Terms offered: Spring 2022, Spring 2021, Spring 2020
Energetics and kinetics of nuclear reactions and radioactive decay, fission, fusion, and reactions of low-energy neutrons; properties of the fission products and the actinides; nuclear models and transition probabilities; interaction of radiation with matter.
Nuclear Reactions and Radiation: Read More [+]
Rules & Requirements

Prerequisites: PHYSICS 7C and NUC ENG 100

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Bernstein, L.

Nuclear Reactions and Radiation: Read Less [-]

NUC ENG 102 Nuclear Reactions and Radiation Laboratory 3 Units

Terms offered: Spring 2016, Spring 2015, Spring 2013
Laboratory course in nuclear physics. Experiments will allow students to directly observe phenomena discussed in Nuclear Engineering 101. These experiments will give students exposure to (1) electronics, (2) alpha, beta, gamma radiation detectors, (3) radioactive sources, and (4) experimental methods relevant for all aspects of nuclear science. Experiments include: Rutherford scattering, x-ray fluorescence, muon lifetime, gamma-gamma angular correlations, Mossbauer effect, and radon measurements.
Nuclear Reactions and Radiation Laboratory: Read More [+]
Rules & Requirements

Prerequisites: NUC ENG 101

Hours & Format

Fall and/or spring: 15 weeks - 1 hour of lecture, 1 hour of discussion, and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Norman

Nuclear Reactions and Radiation Laboratory: Read Less [-]

NUC ENG 104 Radiation Detection and Nuclear Instrumentation Laboratory 4 Units

Terms offered: Fall 2022, Fall 2021, Fall 2020
Basic science of radiation measurement, nuclear instrumentation, neutronics, radiation dosimetry. The lectures emphasize the principles of radiation detection. The weekly laboratory applies a variety of radiation detection systems to the practical measurements of interest for nuclear power, nuclear and non-nuclear science, and environmental applications. Students present goals and approaches of the experiements being performed.
Radiation Detection and Nuclear Instrumentation Laboratory: Read More [+]
Rules & Requirements

Prerequisites: NUC ENG 101 or consent of instructor; NUC ENG 150 recommended

Hours & Format

Fall and/or spring: 15 weeks - 2 hours of lecture and 4 hours of laboratory per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Vetter

Formerly known as: 104A

Radiation Detection and Nuclear Instrumentation Laboratory: Read Less [-]

NUC ENG 107 Introduction to Imaging 3 Units

Terms offered: Fall 2022, Fall 2020, Fall 2018
Introduction to medical imaging physics and systems, including x-ray computed tomography (CT), nuclear magnetic resonance (NMR), positron emission tomography (PET), and SPECT; basic principles of tomography and an introduction to unfolding methods; resolution effects of counting statistics, inherent system resolution and human factors.
Introduction to Imaging: Read More [+]
Rules & Requirements

Prerequisites: NUC ENG 101 and NUC ENG 104

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Vetter

Introduction to Imaging: Read Less [-]

NUC ENG 120 Nuclear Materials 4 Units

Terms offered: Fall 2022, Fall 2021, Fall 2020
Effects of irradiation on the atomic and mechanical properties of materials in nuclear reactors. Fission product swelling and release; neutron damage to structural alloys; fabrication and properties of uranium dioxide fuel.
Nuclear Materials: Read More [+]
Rules & Requirements

Prerequisites: MAT SCI 45 and one of the following: ENGIN 40, MEC ENG 40, or CHM ENG 141

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Wirth

Nuclear Materials: Read Less [-]

NUC ENG 124 Radioactive Waste Management 3 Units

Terms offered: Fall 2022, Spring 2021, Spring 2020
Components and material flowsheets for nuclear fuel cycle, waste characteristics, sources of radioactive wastes, compositions, radioactivity and heat generation; waste treatment technologies; waste disposal technologies; safety assessment of waste disposal.
Radioactive Waste Management: Read More [+]
Rules & Requirements

Prerequisites: NUC ENG 100

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Ahn

Radioactive Waste Management: Read Less [-]

NUC ENG 130 Analytical Methods for Non-proliferation 3 Units

Terms offered: Spring 2022, Spring 2021, Spring 2020
Use of nuclear measurement techniques to detect clandestine movement and/or possession of nuclear materials by third parties. Nuclear detection, forensics, signatures, and active and passive interrogation methodologies will be explored. Techniques currently deployed for arms control and treaty verification will be discussed. Emphasis will be placed on common elements of detection technology from the viewpoint of resolution of threat signatures from false positives due to naturally occurring radioactive material. Topics include passive and active neutron signals, gamma ray detection, fission neutron multiplicity, and U and Pu isotopic identification and age determination.
Analytical Methods for Non-proliferation: Read More [+]
Rules & Requirements

Prerequisites: NUC ENG 101 (or similar background in nuclear physics), or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Morse

Analytical Methods for Non-proliferation: Read Less [-]

NUC ENG C146 Radiochemical Methods in Nuclear Technology and Forensics 3 Units

Terms offered: Spring 2022, Spring 2021
Experimental illustrations of the interrelation between chemical and nuclear science and technology and nuclear forensics; radioactive decay and counting techniques; nuclear spectroscopy; fundamental radiochemical techniques; radiochemical separations techniques; tracers; activation analysis; forensic applications of radiochemistry; fusion, fission and nuclear reactors.
Radiochemical Methods in Nuclear Technology and Forensics: Read More [+]
Objectives & Outcomes

Course Objectives: Familiarize students with principles of nuclear and radiochemistry and its many important applications in our daily lives; provide hands-on training.

Student Learning Outcomes: A solid understanding of nuclear and radiochemistry; proficiency in safe handling of radioactive materials in the laboratory, and appreciation for the wide application of radiochemical techniques in chemistry, nuclear technology, and nuclear forensics.

Rules & Requirements

Prerequisites: CHEM 4B or CHEM 15; and CHEM 143 is recommended

Credit Restrictions: Students will receive no credit for CHEM 146 after completing CHEM 144, or CHEM C144.

Hours & Format

Fall and/or spring: 15 weeks - 1.5 hours of lecture and 4.5 hours of laboratory per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Formerly known as: Chemistry 146

Also listed as: CHEM C146

Radiochemical Methods in Nuclear Technology and Forensics: Read Less [-]

NUC ENG 150 Introduction to Nuclear Reactor Theory 4 Units

Terms offered: Spring 2022, Spring 2021, Spring 2020
Neutron interactions, nuclear fission, and chain reacting systematics in thermal and fast nuclear reactors. Diffusion and slowing down of neutrons. Criticality calculations. Nuclear reactor dynamics and reactivity feedback. Production of radionuclides in nuclear reactors.
Introduction to Nuclear Reactor Theory: Read More [+]
Rules & Requirements

Prerequisites: MATH 53, MATH 54, and NUC ENG 100

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Greenspan, Vujic

Introduction to Nuclear Reactor Theory: Read Less [-]

NUC ENG 155 Introduction to Numerical Simulations in Radiation Transport 3 Units

Terms offered: Spring 2022, Spring 2021, Fall 2019
Computational methods used to analyze radiation transport described by various differential, integral, and integro-differential equations. Numerical methods include finite difference, finite elements, discrete ordinates, and Monte Carlo. Examples from neutron and photon transport; numerical solutions of neutron/photon diffusion and transport equations. Monte Carlo simulations of photon and neutron transport. An overview of optimization techniques for solving the resulting discrete equations on vector and parallel computer systems.
Introduction to Numerical Simulations in Radiation Transport: Read More [+]
Rules & Requirements

Prerequisites: MATH 53, MATH 54, and ENGIN 7

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructors: Vujic, Wirth

Introduction to Numerical Simulations in Radiation Transport: Read Less [-]

NUC ENG 156 Nuclear Criticality Safety 3 Units

Terms offered: Fall 2022, Fall 2021, Fall 2020
This course provides an introduction to the field of nuclear criticality safety. Topics include: a review of basic concepts related to criticality (fission, cross sections, multiplication factor, etc.); criticality safety accidents; standards applicable to criticality safety; hand calculations and Monte Carlo methods used in criticality safety analysis; criticality safety evaluation documents.
Nuclear Criticality Safety: Read More [+]
Objectives & Outcomes

Course Objectives: The objective of this course is to acquaint Nuclear Engineering students with the concepts and practice of nuclear criticality safety, and to help prepare them for a future career in this field.

Student Learning Outcomes: At the end of this course, students should be able to:
Explain and define criticality safety factors for operations.
Discuss previous criticality accidents and their causal factors, including parameters involved in solution and metal critical accidents.
Identify and discuss the application of several common hand calculation methods.
Describe the importance of validation of computer codes and how it is accomplished.
Discuss ANSI/ANS criticality safety regulations.
Describe DOE regulations and practices in the nuclear criticality safety field.
Complete a Criticality Safety Evaluation.

Rules & Requirements

Prerequisites: NUC ENG 150 or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Alternate method of final assessment during regularly scheduled final exam group (e.g., presentation, final project, etc.).

Instructor: Fratoni

Nuclear Criticality Safety: Read Less [-]

NUC ENG 161 Nuclear Power Engineering 4 Units

Terms offered: Fall 2022, Fall 2021, Fall 2020
Energy conversion in nuclear power systems; design of fission reactors; thermal and structural analysis of reactor core and plant components; thermal-hydraulic analysis of accidents in nuclear power plants; safety evaluation and engineered safety systems.
Nuclear Power Engineering: Read More [+]
Rules & Requirements

Prerequisites: Course(s) in fluid mechanics and heat transfer (MEC ENG 106 and MEC ENG 109; or CHM ENG 150A); Course in Thermodynamics (ENGIN 40, MEC ENG 40, or CHM ENG 141)

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture and 1 hour of discussion per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Peterson

Nuclear Power Engineering: Read Less [-]

NUC ENG 162 Radiation Biophysics and Dosimetry 3 Units

Terms offered: Spring 2022, Spring 2021, Spring 2020
Interaction of radiation with matter; physical, chemical, and biological effects of radiation on human tissues; dosimetry units and measurements; internal and external radiation fields and dosimetry; radiation exposure regulations; sources of radiation and radioactivity; basic shielding concepts; elements of radiation protection and control; theories and models for cell survival, radiation sensitivity, carcinogenesis, and dose calculation.
Radiation Biophysics and Dosimetry: Read More [+]
Rules & Requirements

Prerequisites: Upper division standing or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Vujic

Radiation Biophysics and Dosimetry: Read Less [-]

NUC ENG 167 Risk-Informed Design for Advanced Nuclear Systems 3 Units

Terms offered: Fall 2021, Fall 2019, Fall 2017
Project-based class for design and licensing of nuclear facilities, including advanced reactors. Elements of a project proposal. Regulatory framework and use of deterministic and probabilistic licensing criteria. Siting criteria. External and internal events. Identification and analysis of design basis and beyond design basis events. Communication with regulators and stakeholders. Ability to work in and contribute to a design team.
Risk-Informed Design for Advanced Nuclear Systems: Read More [+]
Objectives & Outcomes

Course Objectives: * Introduce students to the methods and models for event identification, accident analysis, and risk assessment and management for internally and externally initiated events.
* Introduce students to the regulatory requirements for design, construction and operation of nuclear facilities licensed by the U.S. Nuclear Regulatory Commission.
* Introduce students to the safety principles and methods used to design, construct and operate a safe nuclear facility, for a specific site and application.
* Provide a basic understanding of similarities and differences in regulation of nuclear facilities versus other technologies (biotech, commercial aviation, commercial space launch, civil infrastructure).
* Provide a basic understanding the risk-informed design process and an opportunity to experience contributing in a focused area to a design project.
* Provide students with experiential knowledge in developing schedules, allocating work responsibilities, and working in teams.
* Provide students with experiential knowledge in the preparation and evaluation a Safety Analysis Report for meeting USNRC regulatory requirements, including response to Requests for Additional Information (RAIs).

Student Learning Outcomes: * Develop a broad understanding of safety principles and methods used in design, construction and licensing of nuclear facilities.
* Develop a broad understanding of the U.S. Nuclear Regulatory Commission's regulatory requirements for nuclear facilities.
* Have awareness of key similarities and differences in regulation of nuclear facilities versus other technologies (biotech, commercial aviation, commercial space launch, civil infrastructure).
* Have awareness of the major topics covered in a Safety Analysis Report (SAR) and experience in developing and writing at least one element of a SAR.
* Have developed experience and skills in communication with the business community, the public, and regulators.
* Have developed experience and skills in establishing a project schedule, allocating work responsibilities, and working in teams.
* Have understanding of application of event identification, event frequency and consequence analysis, risk assessment and management for internally and externally initiated events in the design process.

Rules & Requirements

Prerequisites: Completion of at least two upper division engineering courses providing relevant skills. Choose from the following:
CHM ENG 150A, CHM ENG 180, CIV ENG 111, CIV ENG 120, CIV ENG 152, CIV ENG 166, CIV ENG 175, ENGIN 120, IND ENG 166, IND ENG 172, MEC ENG 106, MEC ENG 109, MEC ENG C134 / EL ENG C128, MEC ENG 146, NUC ENG 120, NUC ENG 124, NUC ENG 150, and NUC ENG 161

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

NUC ENG 170A Nuclear Design: Design in Nuclear Power Technology and Instrumentation 3 Units

Terms offered: Spring 2022, Spring 2021, Spring 2020
Design of various fission and fusion power systems and other physically based applications. Each semester a topic will be chosen by the class as a whole. In addition to technology, the design should address issues relating to economics, the environment, and risk assessment.
Nuclear Design: Design in Nuclear Power Technology and Instrumentation: Read More [+]
Rules & Requirements

Prerequisites: Senior standing or consent of instructor

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Formerly known as: 170

Nuclear Design: Design in Nuclear Power Technology and Instrumentation: Read Less [-]

NUC ENG 170B Nuclear Design: Design in Bionuclear, Nuclear Medicine, and Radiation Therapy 3 Units

Terms offered: Spring 2010, Spring 2009, Spring 2008
A systems approach to the development of procedures for nuclear medicine and radiation therapy. Each semester a specific procedure will be studied and will entail the development of the biological and physiological basis for a procedure, the chemical and biochemical characteristics of appropriate drugs, dosimetric requirements and limitations, the production and distribution of radionuclides and/or radiation fields to be applied, and the characteristics of the instrumentation to be used.
Nuclear Design: Design in Bionuclear, Nuclear Medicine, and Radiation Therapy: Read More [+]
Rules & Requirements

Prerequisites: Senior standing

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Formerly known as: 167

Nuclear Design: Design in Bionuclear, Nuclear Medicine, and Radiation Therapy: Read Less [-]

NUC ENG 175 Methods of Risk Analysis 3 Units

Terms offered: Fall 2022, Fall 2020, Fall 2018
Methodological approaches for the quantification of technological risk and risk based decision making. Probabilistic safety assessment, human health risks, environmental and ecological risk analysis.
Methods of Risk Analysis: Read More [+]
Rules & Requirements

Prerequisites: Upper division standing

Hours & Format

Fall and/or spring: 15 weeks - 4 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Kastenberg

Methods of Risk Analysis: Read Less [-]

NUC ENG 180 Introduction to Controlled Fusion 3 Units

Terms offered: Fall 2022, Fall 2021, Fall 2020
Introduction to energy production by controlled thermonuclear reactions. Nuclear fusion reactions, energy balances for fusion systems, survey of plasma physics; neutral beam injection; RF heating methods; vacuum systems; tritium handling.
Introduction to Controlled Fusion: Read More [+]
Rules & Requirements

Prerequisites: PHYSICS 7C

Hours & Format

Fall and/or spring: 15 weeks - 3 hours of lecture per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam required.

Instructor: Morse

Introduction to Controlled Fusion: Read Less [-]

NUC ENG H194 Honors Undergraduate Research 1 - 4 Units

Terms offered: Fall 2022, Summer 2022 10 Week Session, Spring 2022
Supervised research. Students who have completed three or more upper division courses may pursue original research under the direction of one of the members of the staff. A final report or presentation is required. A maximum of three units of H194 may be used to fulfill a technical elective requirement in the Nuclear Engineering general program or joint major programs.
Honors Undergraduate Research: Read More [+]
Rules & Requirements

Prerequisites: Upper division technical GPA of 3.3, consent of instructor and faculty advisor

Repeat rules: Course may be repeated for credit up to a total of 8 units.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of independent study per week

Summer: 10 weeks - 1.5-6 hours of independent study per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Letter grade. Final exam not required.

Honors Undergraduate Research: Read Less [-]

NUC ENG 198 Group Study for Advanced Undergraduates 1 - 4 Units

Terms offered: Fall 2022, Fall 2021, Spring 2021
Group studies of selected topics.
Group Study for Advanced Undergraduates: Read More [+]
Rules & Requirements

Prerequisites: Upper division standing

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 1-4 hours of directed group study per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Group Study for Advanced Undergraduates: Read Less [-]

NUC ENG 199 Supervised Independent Study 1 - 4 Units

Terms offered: Fall 2022, Spring 2022, Fall 2021
Supervised independent study. Enrollment restrictions apply; see the Introduction to Courses and Curricula section of this catalog.
Supervised Independent Study: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor and major adviser

Credit Restrictions: Course may be repeated for credit for a maximum of 4 units per semester.

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Fall and/or spring: 15 weeks - 0 hours of independent study per week

Summer:
6 weeks - 1-5 hours of independent study per week
8 weeks - 1-4 hours of independent study per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Supervised Independent Study: Read Less [-]

NUC ENG S199 Supervised Independent Study 1 - 4 Units

Terms offered: Prior to 2007
Supervised independent study. Please see section of the for description and prerequisites.
Supervised Independent Study: Read More [+]
Rules & Requirements

Prerequisites: Consent of instructor and major adviser

Credit Restrictions: Course may be repeated for credit for a maximum of 4 units per semester.

Repeat rules: Course may be repeated for credit without restriction.

Hours & Format

Summer: 8 weeks - 0 hours of independent study per week

Additional Details

Subject/Course Level: Nuclear Engineering/Undergraduate

Grading/Final exam status: Offered for pass/not pass grade only. Final exam not required.

Supervised Independent Study: Read Less [-]