PRE-MEDICAL PHYSICS

This degree emphasizes the nuclear sciences rather than nuclear engineering. Students pursue a pre-medical specialization or a pre-medical physics specialization. Any student pursuing this degree must have a selected program, including option area electives, approved in advance by an advisor.

About this Program

- **College:** Herbert Wertheim College of Engineering (http://catalog.ufl.edu/UGRD/colleges-schools/UGENG/)
- **Degree:** Bachelor of Science
- **Specializations:** Pre-Medical (http://catalog.ufl.edu/UGRD/colleges-schools/UGENG/NRA_BS/NRA_BS01/) | Pre-Medical Physics (p. 1)
- **Credits for Degree:** 125

To graduate with this major, students must complete all university, college, and major requirements.

Department Information

The Department of Materials Science and Engineering strives to serve the scientific and engineering community of the state and nation by providing quality education in the field, conducting basic and applied research to enhance science in the field, and supplying short courses, technology transfer, industrial consulting, and distance learning to promote engineering in the field.
Website (https://mse.ufl.edu/)

CONTACT

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Map (http://campusmap.ufl.edu/#/index/0184)

Curriculum

- Advanced Engineering Ceramics Certificate
- Biomaterials Certificate
- Combination Degrees
- Materials Science and Engineering
- Materials Science and Engineering Minor
- Metallurgical Engineering Certificate
- Nuclear and Radiological Engineering Minor
- Nuclear and Radiological Sciences
- Nuclear Engineering
- Nuclear Radiation and Reactor Analysis Certificate
- Nuclear Thermal Systems Analysis Certificate
- Polymer Science and Engineering Certificate
- Semiconductor Materials Certificate

Diverse opportunities await graduates of the Department of Nuclear and Radiological Engineering (NRE) because nuclear sciences have and will continue to make major contributions to electricity production, medical diagnostic imaging and therapy, non-destructive testing as well as radiation detection and measurement. These opportunities will continue to grow as we face more challenges in energy production and medicine. For the last three decades, the nuclear industry has contributed over 20% of our country's electricity production, and major advances continue to be made in the development of radiation diagnostics and treatment for medical and industrial applications.

Critical Tracking

Note that critical tracking is the same for both specializations.

Critical Tracking records each student's progress in courses that are required for entry to each major. Please note the critical-tracking requirements below on a per-semester basis.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (http://www.flvc.org/cpp/displayRecord.jsp?cip=142301&track=01) may be used for transfer students.

Semester 1

- Complete 1 of 8 critical-tracking courses with a minimum grade of C within two attempts: BSC 2010, CHM 2045 or CHM 2095, MAC 2311, MAC 2312, MAC 2313, MAP 2302, PHY 2048, PHY 2049
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 2

- Complete 1 additional critical-tracking course with a minimum grade of C within two attempts
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 3

- Complete 2 additional critical-tracking courses with minimum grades of C within two attempts
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 4

- Complete 2 additional critical-tracking courses with minimum grades of C within two attempts
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Semester 5

- Complete all 8 critical-tracking courses with minimum grades of C in each course within two attempts
- 2.5 GPA required for all critical-tracking courses
- 2.0 UF GPA required

Model Semester Plan

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student's academic record and scheduling availability of courses. Prerequisites still apply.

Course	Title	Credits
Semester One		
BSC 2010	Integrated Principles of Biology 1 (**Critical Tracking**; State Core Gen Ed Biological and Physical Sciences)	3
BSC 2010L	Integrated Principles of Biology Laboratory 1	1
Select one:		3
CHM 2045	General Chemistry 1 (**Critical Tracking**; Gen Ed Physical Sciences)	
CHM 2095	Chemistry for Engineers 1 (**Critical Tracking**)	
CHM 2045L	General Chemistry 1 Laboratory (Gen Ed Physical Sciences)	1
MAC 2311	Analytic Geometry and Calculus 1 (**Critical Tracking**; State Core Gen Ed Mathematics)	4
State Core Gen Ed Composition (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Writing Requirement		3
	Credits	**15**
Semester Two		
Select one:		3
CHM 2046	General Chemistry 2 (Gen Ed Physical Sciences)	
CHM 2096	Chemistry for Engineers 2	
CHM 2046L	General Chemistry 2 Laboratory (Gen Ed Physical Sciences)	1
ENC 3246	Professional Communication for Engineers (Gen Ed Composition; minimum grade of C required)	3
MAC 2312	Analytic Geometry and Calculus 2 (**Critical Tracking**; Gen Ed Mathematics)	4
Quest 1 (Gen Ed Humanities)		3
	Credits	**14**
Semester Three		
State Core Gen Ed Humanities (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
State Core Gen Ed Social and Behavioral Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
	Credits	**6**
Semester Four		
MAC 2313	Analytic Geometry and Calculus 3 (**Critical Tracking**; Gen Ed Mathematics)	4
PHY 2048	Physics with Calculus 1 (**Critical Tracking**)	3
PHY 2048L	Laboratory for Physics with Calculus 1 (Gen Ed Physical Sciences)	1
State Core Gen Ed Social and Behavioral Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		6
	Credits	**14**
Semester Five		
COP 2271	Computer Programming for Engineers	2
MAP 2302	Elementary Differential Equations (**Critical Tracking**)	3
PHY 2049	Physics with Calculus 2 (**Critical Tracking**)	3
PHY 2049L	Laboratory for Physics with Calculus 2	1
STA 3032	Engineering Statistics	3
	Credits	**12**
Semester Six		
ENU 4001	Nuclear Engineering Analysis 1 [1]	4
ENU 4605	Radiation Interactions and Sources 1 [1]	4
ENU 4934	Fundamentals of Nuclear and Radiological Engineering (seminar)	1
PHY 3101 or PHY 3063	Introduction to Modern Physics or Enriched Modern Physics	3
PHY 3323	Electromagnetism 1	3
	Credits	**15**
Semester Seven		
APK 2100C	Applied Human Anatomy with Laboratory	4
EEL 3003	Elements of Electrical Engineering	3
EGS 4034	Engineering Ethics and Professionalism	1
PHY 4424	Optics 1	3
Physics elective		3
	Credits	**14**
Semester Eight		
Engineering electives		6
	Credits	**6**
Semester Nine		
APK 2105C	Applied Human Physiology with Laboratory	4
ENU 4612	Nuclear Radiation Detection and Instrumentation	3
ENU 4612L	Nuclear Radiation Detection and Instrumentation Laboratory [1]	1
ENU 4630	Fundamental Aspects of Radiation Shielding [1]	3
ENU 4905	Special Problems in Nuclear and Radiological Engineering (individual work)	1
PHY 4604	Introductory Quantum Mechanics 1	3
	Credits	**15**
Semester Ten		
ENU 4145	Risk Assessment for Radiation Systems [1]	3
ENU 4641C	Applied Radiation Protection [1]	2
Engineering electives		6
Physics elective		3
	Credits	**14**
	Total Credits	**125**

[1] All nuclear engineering and nuclear engineering sciences majors must pass all required undergraduate department courses with an overall C average.

Approved Electives

Engineering Electives

All technical engineering electives must be approved by a department advisor. At least five credits of the technical engineering electives must be ENU courses. Examples include courses in nuclear engineering, engineering materials, thermodynamics, statics, dynamics, and advanced programming.

Examples of Pre-Medical Physics Electives

Code	Title	Credits
ENU 5626	Radiation Biology	3
ENU 5658	Imaging System Analysis with Medical Physics Applications	3

Academic Learning Compact

The major in nuclear and radiological sciences educates students to work professionally in areas related to the control and safe utilization of nuclear energy, radiation and radioactivity.

Before Graduating Students Must

- Pass an assessment by two or more faculty and/or industry practitioners of performance on a major design experience.
- Pass assessment in two or more courses of individual assignments targeted to each learning outcome. Assessment will be provided by the instructor of the course according to department standards.
- Complete requirements for the baccalaureate degree, as determined by faculty.

Students in the Major Will Learn to

Student Learning Outcomes (SLOs)

Content

1. Apply knowledge of mathematics, science and engineering for problem solving in engineering.
2. Analyze and interpret experimental data.

Critical Thinking

3. Develop an engineering design to meet specific technical requirements within realistic constraints such as economic, environmental, health and safety and reliability.
4. Foster the need for lifelong learning and the ability to adapt this to engineering practice.

Communication

5. Function effectively on multidisciplinary skills teams.
6. Communicate effectively, using both oral and written presentations, in engineering practice.

Curriculum Map

I = Introduced; R = Reinforced; A = Assessed

Courses	SLO 1	SLO 2	SLO 3	SLO 4	SLO 5	SLO 6
ENU 4001	I					
ENU 4145						R
ENU 4605	R					
ENU 4612		R	R	R	R	I
ENU 4630		I	I	I	I	
ENU 4641	I A	A	A	A	A	A

Assessment Types

- Assignments
- Exams
- Projects
- Presentations
- Additional assessment includes the senior exit survey