Nuclear Engineering

Nuclear engineering includes the use of radiation in medicine for treatment and diagnostics; design, development and operation of nuclear power systems; numeric simulation of nuclear systems; health physics and radiation protection; biomedical engineering and radiation imaging; nondestructive examination of materials and structures using radiation techniques; nuclear energy for space power and propulsion; and using radiation in food processing, industrial processing and manufacturing control.

About This Major

- **College:** Engineering
- **Degree:** Bachelor of Science in Nuclear Engineering
- **Hours for the Degree:** 128
- **Minor:** Yes
- **Combined-Degree Program:**Yes
- www.nre.ufl.edu

Overview

A full complement of experimental facilities is available, including a 100 KW research and training reactor, a neutron activation analysis laboratory and particle transport and distributed computing laboratories for nuclear systems simulations. The department also has specialized nuclear instrumentation and the Florida Institute of Nuclear Security and Detection (FINDS).

Students should concentrate several electives in one discipline to achieve solid familiarity in a minor field of study. These electives, chosen with an adviser, allow option area specialization in reactor engineering, reactor operations, radioisotopes and nuclear radiation technology, and radiation and biological systems.

Educational Objectives

The Department of Nuclear and Radiological Engineering has established the following educational objectives for its undergraduate program. Graduates will:

- Have successful careers in nuclear engineering or related disciplines;
- Communicate effectively and work collaboratively in nuclear engineering or related disciplines; and
- Use the knowledge and skills obtained in their undergraduate education to practice high ethical professional standards in nuclear engineering or related disciplines.

Goals

The department's primary goal is to educate nuclear and radiological engineering professionals to benefit society in the release, control and safe utilization of nuclear energy, radiation and radioactivity.

Mission

The department will provide quality education and conduct nationally recognized research in nuclear and radiological engineering to serve the needs of Florida and the nation.

Critical Tracking

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

Equivalent critical tracking courses as determined by the State of Florida Common Course Prerequisites may be used for transfer students

Semester 1

- 2.0 UF GPA required for semesters 1-5
- 2.5 GPA on all critical tracking coursework for semesters 1-5
- Complete 1 of 8 critical tracking courses with a minimum grade of C within two attempts: CHM 2045 or CHM 2095, approved biological science course,
  MAC 2311, MAC 2312, MAC 2313, MAP 2302, PHY 2048, PHY 2049

Semester 2

- Complete 1 additional critical tracking course with a minimum grade of C within two attempts

Semester 3

- Complete 2 additional critical tracking courses with minimum grades of C within two attempts

Semester 4

- Complete 2 additional critical tracking courses with minimum grades of C within two attempts

Semester 5

- Complete all 8 critical tracking courses with minimum grades of C in each course within two attempts

Recommended Semester Plan

Engineering Science and Technical Electives: The choice of electives allows emphasis in nuclear power engineering, health physics, engineering physics, nuclear instrumentation, radioisotope applications, radiation imaging, medical treatment and scientific computing.

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold.

Semester 1	Credits
CHM 2045 General Chemistry 1 (GE-P) or CHM 2095 Chemistry for Engineers 1 (GE-P)	**3**
CHM 2045L General Chemistry 1 Laboratory (GE-P)	1
ENU 4934 Fundamentals of Nuclear and Radiological Engineering *	1
MAC 2311 Analytic Geometry and Calculus 1 (GE-M)	**4**
Composition (GE-C, WR)	3
Humanities (GE-H)	3
Total	15
Semester 2	**Credits**
ENC 3254 Professional Communication for Engineers (GE-C) **	3
MAC 2312 Analytic Geometry and Calculus 2 (GE-M)	**4**
PHY 2048 Physics with Calculus 1 (GE-P)	**3**
PHY 2048L Physics with Calculus 1 Laboratory (GE-P)	1
Social and Behavioral Sciences (GE-S)	3
Total	14
Semester 3	**Credits**
MAC 2313 Analytic Geometry and Calculus 3 (GE-M)	**4**
PHY 2049 Physics with Calculus 2 (GE-P)	**3**
PHY 2049L Physics with Calculus 2 Laboratory (GE-P)	1
Humanities (GE-H)	3
Social and Behavioral Sciences (GE-S)	3
Total	14
Semester 4	**Credits**
COP 2271 Computer Programming for Engineers	2
EGM 2511 Engineering Mechanics - Statics	3
MAP 2302 Elementary Differential Equations	**3**
Approved Biological Science (GE-B)	**3**
Humanities (GE-H)	3
Total	14
Semester 5	**Credits**
EGM 3520 Mechanics of Materials	3
EGN 4034 Professional Ethics	1
EML 3100 Thermodynamics 1	3
ENU 4001 Nuclear Engineering Analysis 1 */+	4
ENU 4605 Radiation Interactions and Sources 1 */+	4
Total	15
Semester 6	**Credits**
EEL 3003 Elements of Electrical Engineering	3
EML 4140 Heat Transfer	3
ENU 4103 Reactor Analysis and Computation 1 - Statics *	4
ENU 4133 Reactor Thermal Hydraulics 1	3
ENU 4144 Nuclear Plant Reactor Systems 1 *	3
Total	16
Semester 7	**Credits**
EMA 3010 Materials	3
STA 3032 Engineering Statistics	3
Total	6
Semester 8	**Credits**
ENU 4104 Reactor Analysis and Computation 2 - Dynamics *	3
ENU 4134 Reactor Thermal Hydraulics 2	3
ENU 4191 Elements of NRE Design */***/+	1
ENU 4612C Radiation Detection and Instrumentation Systems	4

ENU 4630 Fundamental Aspects of Radiation Shielding *	3
Total	14

Semester 9	Credits
ENU 4145 Risk Assessment for Radiation Systems *	3
ENU 4192 Nuclear and Radiological Engineering Design 1 */***/+	3
ENU 4505L Nuclear and Radiological Engineering Laboratory 1 *	3
ENU 4641C Applied Radiation Protection *	2
Technical elective ***	3
Total	14

Semester 10	Credits
Technical electives ***	6
Total	6

+ ENU 4001, ENU 4191, ENU 4192 and ENU 4605 require minimum grades of C.

***** All nuclear engineering and nuclear and radiological sciences majors must pass all required undergraduate department courses with an overall C average.

****** Complete ENC 3254 with a grade of C or better.

******* All technical electives must be approved by a department adviser. At least five credits of technical electives must be ENU courses.

ENU Technical Electives

ENU 4194 Control of Nuclear Reactors and Power Plants	3
ENU 5176 Principles of Nuclear Reactor Operations	3
ENU 5176L Principles of Nuclear Reactor Operations Laboratory	1
ENU 5186 Nuclear Fuel Cycles	3
ENU 5351 Space Nuclear Power and Propulsion	3
ENU 5626 Radiation Biology	3
ENU 5658 Image Analysis with Medical Physics Applications	3
ENU 5705 Adv Concepts for Nuclear Energy	3
ENV 4212 Nuclear Power Radioactive Waste Technology	3

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