Nuclear Engineering Certificate

The undergraduate Certificate in Nuclear Engineering is a five-course sequence consisting of three nuclear engineering courses and two discipline specific courses related to nuclear engineering from the various engineering departments. Any undergraduate engineering students in the Swanson School of Engineering and can earn the certificate in conjunction with an undergraduate engineering degree. Qualified students in the Dietrich School of Arts and Science students can pursue the certificate with approval.

After earning the certificate, students should be able to do the following: apply the concepts of nuclear and reactor physics, reactor kinetics, radiation protection, fuel depletion, and heat transfer to engineering problems; apply engineering skills, knowledge, and expertise to nuclear energy problems; for light water reactors, support engineering projects for the design of the reactor core and the reactor coolant system; assess important social and technical issues related to nuclear science and technology; describe and explain the nuclear fuel cycle from mining to disposal including reprocessing and waste management.

Interested students should visit http://www.engineering.pitt.edu/nuclear/ or call 412-624-9720 for more information.

Requirements

Fifteen (15) credits are required to complete the certificate. A minimum 2.5 GPA is required for students to participate in the certificate. Students must obtain a GPA of at least 2.5 for the courses taken. All undergraduate certificate students are required to complete three (3) courses from the list below as well as two (2) department specific courses:

ENGR 1700 - INTRODUCTION TO NUCLEAR ENGINEERING

- Minimum Credits: 3
- Maximum Credits: 3
- Introduction to nuclear science and technology; applications of nuclear engineering; careers in nuclear industry; nuclear history; reactor types; elementary nuclear and reactor physics; nuclear radiation and safety; fuel cycle; regulations and sustainability.
- Academic Career: Undergraduate
- Course Component: Lecture
- Grade Component: Letter Grade
- Course Requirements: PREQ: (PHYS 0152 or 0175 or 0202 or 0476) and (CHEM 0102 or 0112 or 0120 or 0420 OR 0720 or 0770 or 0970); PROG: School of Engineering

Click here for class schedule information.

- ENGR 1701 - FUNDAMENTALS OF NUCLEAR REACTORS
- ENGR 1702 - NUCLEAR PLANT TECHNOLOGY

Plus two (2) Degree Specific Courses

Students should select two (2) courses from the list below that is appropriate to their degree of study.
Bioengineering

- IE 1061 - HUMAN FACTORS ENGINEERING
- BIOENG 1810 - BIOMATERIALS AND BIOCOMPATIBILITY

Chemical Engineering

- CHE 0200 - CHEMICAL ENGINEERING THERMODYNAMICS
- CHE 0300 - TRANSPORT PHENOMENA
- CHE 0400 - REACTIVE PROCESS ENGINEERING
- CHE 0500 - SYSTEMS ENGINEERING 1: DYNAMICS AND MODELING

Civil Engineering

- CEE 1340 - CONCRETE STRUCTURES 1
- CEE 1514 - ENVIRONMENTAL IMPACT ASSESSMENT
- CEE 2340 - CONCRETE STRUCTURES 2
- CEE 2343 - PRESTRESSED CONCRETE

Electrical and Computer Engineering

- ECE 1150 - COMPUTER NETWORKS
- ECE 1160 - INTRODUCTION TO EMBEDDED SYSTEM DESIGN
- ECE 1673 - LINEAR CONTROL SYSTEMS
- ECE 1769 - POWER SYSTEM ANALYSIS 1

Engineering Science

Engineering Science majors can choose the [Nuclear Energy Concentration](https://catalog.upp.pitt.edu/preview_program.php?catoid=170&poid=51009&returnto=15189&print#).

Industrial Engineering

- ENGR 1500 - ETHICAL DILEMMAS BALANCING COST, RISK, AND SCHEDULING
- IE 1062 - DATA MINING
- IE 1076 - TOTAL QUALITY MANAGEMENT
- IE 1086 - DECISION MODELS
- IE 1089 - ADDITIVE MANUFACTURING

Mechanical Engineering and Materials Science

- MEMS 1030 - MATERIAL SELECTION
- MEMS 1033 - FRACTURE MECHANICS FOR PRODUCT DESIGN AND MANUFACTURING
- MEMS 1045 - AUTOMATIC CONTROLS
- MEMS 1047 - FINITE ELEMENT ANALYSIS
- MEMS 1052 - HEAT AND MASS TRANSFER
- MEMS 1063 - PHASE TRANSFORMATION AND MICROSTRUCTURE EVOLUTION
- MEMS 1065 - THERMAL SYSTEMS DESIGN
- MEMS 1070 - MECHANICAL BEHAVIOR OF MATERIALS
- MEMS 1071 - APPLIED FLUID MECHANICS
Non-engineering Math and Science Majors

Non-engineering math and science majors (e.g., Math, Chemistry, Physics) must complete the three (3) core Nuclear Engineering courses, provide the Director of the Nuclear Engineering a proposal for two additional courses in the student’s major and obtain the Director’s signed approval. The ~1-page proposal must include the following:

- two (2) courses from the student’s major
- the catalog description of the two (2) courses
- a short statement on how these two (2) courses complement the three (3) core nuclear courses and/or apply to nuclear engineering.

This proposal will be signed by the Director and kept on record by the MEMS Department.