# Nuclear Engineering

Chair and Professor: Pope

Professors: Brey and Dunzik-Gougar

Research Professor: Schultz

Associate Professor: None

Assistant Professors: Ali, LaBrier

Emeriti: Gesell, Imel, Kunze

| Program Description | Type | Degree |
|---|---|---|
| Doctor of Philosophy in Nuclear Science and Engineering, Ph.D. (https://coursecat.isu.edu/graduate/scienceengineering/nuclearengineering/daphilosophynuclearscience/) | Degree | Ph.D. |
| Master of Science in Nuclear Science and Engineering, M.S. (https://coursecat.isu.edu/graduate/scienceengineering/nuclearengineering/msnuclearscience/) | Degree | M.S. |
| Master of Science in Health Physics (https://coursecat.isu.edu/graduate/scienceengineering/nuclearengineering/mshealthphysics/) | Degree | M.S. |
| Nuclear Safeguards and Security Certificate (https://coursecat.isu.edu/graduate/scienceengineering/nuclearengineering/certsafeguardsecurity/) | Certificate | Certificate |

## Doctor of Philosophy in Nuclear Science and Engineering

This program combines the atomic nuclear aspects of engineering and science. Research areas range from the more traditional nuclear engineering disciplines (reactor physics, thermal hydraulics, and reactor design) to cross-discipline topics in the fields of health physics, radiation detection and measurement, nuclear fuels, materials development, nuclear fuel cycle systems studies, and radioactive waste management.

### Goals

- Prepare graduates to conduct and disseminate independent scholarly research.
- Prepare graduates for careers in academia or industry.

### Objectives

- Increase the knowledge of graduates in their specialized field: chemistry, engineering (all disciplines), geosciences, mathematics, and physics.
- Enhance the ability of graduates to contribute to their chosen field.
- Enhance effective written and oral communication skills of graduates.

## Master of Science in Nuclear Science and Engineering

The master’s degree program in Nuclear Science and Engineering prepares the student for advanced placement in the nuclear industry in commercial, research, or development areas. It provides in-depth studies and advanced design concepts in several areas of modern nuclear science and engineering. It is also an excellent program of study for entering the doctoral program in Nuclear Science and Engineering.

### Goals

- Enhance the knowledge of graduates in the physics and engineering of nuclear reactors, the nuclear fuel cycle, and other aspects of the study of nuclear engineering. At Idaho State University, while our emphasis is on advanced reactors and the science and technology of nuclear fuel recycling, we allow the flexibility to build programs on other aspects, which can include systems studies and simulations including policy aspects, radiation shielding and detection, medical applications of radiation, and the economics and safety of all of these applications.
- Increase the ability of graduates to synthesize and apply these advanced concepts to develop realistic nuclear engineering designs and to solve identified problems, designing strategies for implementing them safely, ethically, and effectively.
- Enhance the ability of graduates to effectively communicate these concepts both in oral and written formats.

## Master of Science in Health Physics

The Nuclear Engineering Program additionally offers the master's option in Health Physics. Health Physics, an applied science, is concerned with the protection of humans and their environment from the possible harmful effects of radiation while providing for its beneficial uses. It is a multi-disciplined profession that incorporates aspects of both the physical and biological sciences. The master's program in Health Physics is accredited by the Applied and Natural Sciences Accreditation Commission of ABET, *http://www.abet.org.* The Idaho State University Health Physics programmatic educational objectives have been developed via close collaboration of faculty and the Idaho State University Health Physics Program Advisory Board.

The educational objectives of the ISU Health Physics program are to produce health physicists with:

1. broad, fundamental technical knowledge;
2. written and verbal communication skills;
3. professional judgment and capability to think critically;
4. practical experience in solving applied health physics problems;
5. the ability to work independently; and
6. a professional ethic of magnitude sufficient for them to work productively and successfully in a variety of health physics settings.

The graduate program has two additional educational objectives, which are to equip graduates with:

1. An ability to conduct research; and
2. Professional tools and experience above that expected for the baccalaureate program.

Students may enter the master's program in health physics from several undergraduate majors including health physics, physics, chemistry, biology, and other science or engineering majors. Additional course work to correct deficiencies may be necessary.