Physics/Engineering Physics

Why study PHYSICS or ENGINEERING PHYSICS at Morningside?

Individual attention. Innovative, discovery-based learning. Excellent preparation for careers, research, and graduate school. Opportunities to explore challenging, real world topics. A foundation for most engineering fields, including civil, computer, electrical, environmental, and mechanical.

What makes the program special?

- A balanced curriculum provides the theoretical framework needed for graduate studies and the practical skills needed in industry.
- Opportunities abound for rewarding community service projects, internships with local engineering firms, and summer research or upper-level student research abounds.
- All classes are taught by faculty (unlike larger universities, where graduate assistants teach many undergraduate courses).
- A low student faculty ratio in the department means classes are small and students never run the risk of getting lost in the crowd.
- Professors are primarily devoted to teaching undergraduates.

- Innovative teaching is based on discovery, small group activities, cooperative learning, and design projects.
- Students have access to the latest technologies. Almost all labs use computer-assisted data collection and analysis.

What's New?

- All engineering classes include an element of design, in which students actually use the concepts they have been developing.
- A suite of free electives allows students to pursue a variety of interests.
- Engineering in the Community service-learning course enables students to engage in an engineering project that benefits the community.
PHYSICS/ENGINEERING PHYSICS

How will I benefit?
As a physics or engineering-physics major you will develop:
• A thorough understanding of the relationship between physics and the other sciences.
• A foundation in theoretical and experimental physics and engineering.
• Preparation to conduct research in industry and in national laboratories.
• Science literacy, a life-long interest in the physical sciences, and a sound grasp of all physical processes.
• The broad-based writing skills expected of practicing physicists and engineers.

How about the details?
We offer a selection of major programs, each with its own emphasis.

Engineering Physics
This four-year program is intended for students who want to work at the boundary between science and engineering. Students have the benefit of developing practical skills and learning the theoretical basis behind those skills. Graduates have the necessary skills to take a job in small- to medium-scale industry right out of college, or go on to graduate school in a variety of areas, including science, applied science, engineering, or professional programs such as medicine, architecture, and law.

Physics
This four-year program is intended for students whose primary interest is in the theoretical side of the physical world. This program is ideal for students interested in pursuing graduate studies in science, applied science, engineering, or professional programs such as medicine, architecture, and law.

Physics Teaching
The physics teaching major is a four-year program recommended for students who wish to teach physics in the high school system.

General Sciences Teaching
This interdisciplinary major (with chemistry and biology) is intended for students who wish to teach a combination of physics, earth science, chemistry, and biology at the middle school or elementary school level.

Courses
Students majoring in physics or engineering at Morningside College can take a wide variety of classes. Our introductory general physics course-sequence provides a broad survey of physics principles and applications in a setting that combines classroom experiences and lab work. Innovative course structures allow students to concentrate on developing concepts, mathematical tools, and problem-solving strategies one at a time. This approach makes the sequence more manageable than does the traditional structure. The result is a greatly enhanced likelihood of successfully moving on to upper-level courses.

Advanced courses include both classroom-based courses, such as statistics, dynamics, and quantum mechanics, and laboratory courses, such as electronics, and the advanced physics and engineering labs, which often involve a significant component of creative design work.

In our engineering applications courses, students learn to use the tools of the trade, such as MATLAB and engineering graphics software. Students will also take mathematics courses which provide them with the framework for analyzing physical systems and engineering problems.

We also have classes for students to learn about other areas of science, such as astronomy, meteorology, geology, and ecology.

If you are interested in giving back to the community, our service-learning courses—Engineering in the Community and Physics in the Community—provide an opportunity to learn while engaging in an engineering or physics education project that benefits the local community.

Facilities and resources
• Well-equipped labs with computers for data collection and analysis.
• Workshop equipped with basic tools to be used in support of engineering design projects.

Who are the faculty?
Dave Slaven, Assistant Professor
Special interests include elementary particle physics, especially the physics of the weak nuclear force. To learn more about physics, visit his Web site at http://webs.morningside.edu/slaven/Physics/.

Education: Ph.D. in theoretical high energy physics from Iowa State University

Plumstead, Assistant Professor
Special interests include quantum systems in curved spacetime.

Education: Ph.D. and M.A. in physics from the University of Wisconsin.

What else can I do?
• Join a campus club such as the Society of Physics Students, the Association for Computing Machinery, or the Mathematical Association of America, to socialize with like-minded students and explore developments and career opportunities in your field.
• Get initiated into Kappa Mu Epsilon, the national math honor society, or Sigma Pi Sigma, the national physics honor society.

Where can I go from here?
Careers. Physics majors are highly sought after in all fields that involve analytical or abstract thinking. Some examples include:
• Industry—our students have the theoretical and practical backgrounds to compete in industrial settings.
• Additional background in business, a second language, or communications through a minor or cluster further enhance employability.
• Research—either in industry or in research labs.
• Teaching physics—to meet the chronic shortage of high school physics teachers nationwide.
• Publishing—technical books, journals and software.
• Software design—with abstract thinking skills vital to data processing and computer games.
• Telecommunications—television, image analysis, radio, and recording technology.

Graduate school. Students are prepared to attend graduate school in either physics or engineering.