

Majoring in

Physics

Description of Physics

What is physics?

Physics is the study of the fundamental interactions involving time, space, energy, and matter.

What do physics majors study?

Physics majors study the laws and properties of matter, motion, energy, light and electricity to understand the physical world. Physics majors learn about classical physics by studying such subjects as mechanics, thermal physics, optics, electricity, and magnetism. They study modern physics, learning about electrons, photons, atoms, molecules and solids, and studying their behaviors. They also study quantum mechanics, looking at electromagnetic waves and energy levels.

What skills do physics majors have?

Physics majors usually:

- Enjoy and are skilled in math and science;
- Are logical and organized;
- Are creative problem solvers; and
- Are able to use a computer to analyze and interpret their scientific findings.

What else do physics majors study?

Physics majors gain a broad background not only in science and math, but also in the liberal arts area. These courses help develop knowledge and skills that are applied throughout one's lifetime.

Liberal arts courses provide a background to strengthen critical thinking; problem solving; written, oral, and interpersonal communication; quantitative, analytical, and reasoning skills. These skills are considered very important for future success in the workplace. A strong liberal arts background also provides the foundation of an educated person.

Course Requirements

General education: About 50 credit hours of general education courses are required. These courses give a broad range of knowledge in behavioral science, natural science, foreign language, writing, arts, ethics, civilization, literature, and urban environment.

Major courses: A total of 53 credit hours of physics and advanced math courses are required. Physics majors are required to take the following core courses:

- Calculus (two semesters)
- Classical mechanics
- Differential equations
- Electromagnetism
- Modern physics
- Multivariate calculus
- Quantum physics
- Senior physics lab
- Statistical mechanics and thermodynamics
- University physics (two semesters)

Other major-related courses that physics may take include:

- Condensed matter physics
- Fluid dynamics and heat transfer
- Linear algebra
- Numerical analysis
- Optics
- Visualization of physics using math

Electives: About 9 credits required. Some physics majors choose to double major in engineering and physics. Others participate in the teacher preparation program or the accelerated B.S./M.S. program.

Careers in Physics

The physics major provides a good background for entry to any number of professional fields. Some of these careers include:

- Computer systems analyst
- Electronics technician
- Engineer
- Environmental analyst
- Hazardous waste manager
- Insurance, securities, and real estate sales
- Laboratory technician or assistant
- Medical products designer
- Quality control manager
- Research and development scientist
- Research assistant
- Technical sales representative
- Technical writer

Over half of physics majors go on to graduate school. Some are admitted to medical, optometry, or other health sciences programs. Other students enter graduate programs in physics, engineering, or related disciplines. The following are examples of careers that physics majors pursue which require an advanced degree.

- Astrophysicist
- Atomic physicist
- Geophysicist
- High school science or math teacher
- Medical physicist
- National lab research administrator
- Nuclear physicist
- Optometrist

- Physician
- Physics professor
- Seismologist

Next Steps

If you are interested in learning more about becoming a physics major at VCU, consider doing each of the following things. Check them off as you complete each step.

- Check out the VCU physics webpage at www.has.vcu.edu/phy/.
- Take a calculus and calculus-based physics course.
- Read about the major in the *Undergraduate Bulletin*.
- Review the physics major graduation worksheet with an academic advisor.
- Talk to one or more upper-level physics students about their major experience.
- Discuss the major with one or more physics professors.
- Go to the Career Center to read about careers in physics.
- Go to the VCU bookstore and browse through the physics textbook section.

- Explore undergraduate research and internship possibilities through the Physics Department and the Career Center.
- Check out the American Institute of Physics webpage at www.aip.org for information on topics related to the study of physics.

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