

Notre Dame Science Department of Physics

Fall 2011

What is physics?

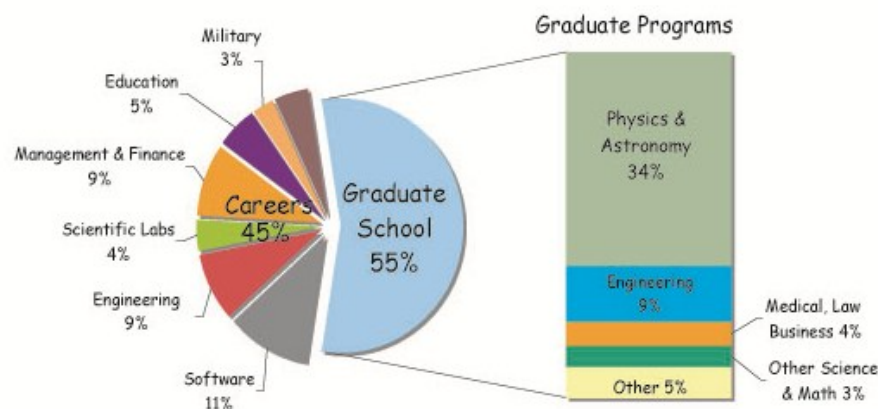
The word “physics” comes from the Greek, meaning “knowledge of nature” and was once called “natural philosophy.” Physicists ask and answer the most fundamental questions in science, like “What is the universe made of?” or “What laws govern all of nature?” or “What are matter, space, and time?” Even seemingly philosophical questions like “What is the nature of reality?” can be approached using mathematics and experiment, the two primary tools of physics.

Physics is the science that underlies all other sciences and engineering. Its discoveries impact every corner of science, technology, and even the humanities.

Physics is a broad science, encompassing many sub-fields that study the universe at its largest (**astronomy & astrophysics**), its smallest (**nuclear & particle physics**), and points in between. It touches on the cores of every other science (**biophysics, applied physics, medical physics**). It is both an applied field that leads directly to technological innovation (**solid state & atomic physics**) and an abstract field devoted to questions which have puzzled mankind since ancient times (**cosmology & theoretical physics**).

Physicists are at the forefront in the creation of the modern world. Physicists discovered radio waves, x-rays, radioactivity, electromagnetism, superconductivity, and the structure of the atom and its constituents. They invented radar, transistors, computers, lasers, MRI's, electron microscopes, nuclear power, and the CCD at the heart of your digital camera. Even the World Wide Web was born from a physics research program.

Physicists explained gravity, discovered how the sun works, found planets beyond our own, and measured the distances and ages of the stars and of the universe itself. And physicists have brought us some of the greatest advances in the realm of human intellect: the Laws of Mechanics and Electromagnetism, the Theory of Relativity, Quantum Mechanics, and the Big Bang Model. The pantheon of physics includes quite a few giants: Galileo, Newton, Maxwell, Einstein, Feynman, and Hawking among many others.



What can I do with a physics degree?

Almost anything!

A physics degree is not just an education in physics, it is an education in problem solving and mathematical modeling.

Nationally, 55% of physics majors continue on to graduate degrees, usually in physics, engineering, medicine, law, math, or another science. A physics degree is sought after by law, medical, and business schools because it represents completion of an intense training in how to think critically. And this training is easy to notice. When physics majors take graduate school entrance exams they usually come out on top.

Physics majors:

- Earn the highest score on the GRE graduate school entrance exam of any and all college majors. They rank #1 in the Quantitative and the Analytical Thinking sections and score higher on the Verbal section than all other science, engineering, and business majors.
- Earn, along with math majors, the highest scores on the LSAT law school entrance exam of any and all other college majors.
- Earn the highest scores on the GMAT business school entrance exams of all majors, including business majors!
- Earn the second highest scores on the MCAT medical school entrance exams, after biomedical engineers, but ahead of biology majors.

The 45% that don't continue their education find a variety of positions, usually in the fields of computer science, engineering, management, finance, and education. Business consulting and international finance firms recruit physics majors enthusiastically for their analytic training. So even if a physics

major never solves the Schrödinger Equation again, their degree is the mark of a deep and broad preparation for life in our modern world.

Notre Dame **Science** Department of Physics

What curriculum options exist for a physics major?

We offer a basic physics major with 60 credits of science, of which 42 are in physics. This can be supplemented with concentrations of 14 credits each in advanced physics, astrophysics, and/or computing. There is a separate physics-in-medicine major designed for pre-meds or students with an interest in medical technology; and a separate physics in education program, in conjunction with Saint Mary's College, for those interested in teaching high school.

Is there a foreign language requirement?

All College of Science major programs require competency in one foreign language at the Intermediate I level.

How many students are in the physics major?

We have about 30 majors in each year. Roughly 12 are pre-Medical, 2-3 are pre-law, 2-3 are pre-business, with the remainder interested in pursuing physics, astronomy, math, or engineering careers.

Who will teach my courses?

At Notre Dame you will be taught by the faculty whose members have been recruited from around the world, chosen for their outstanding research programs and their commitment to teaching. The professors are approachable, welcome student interaction, and bring their research into the classroom.

Can I take courses outside the major?

Yes! Unlike some fields, our degree program has plenty of flexibility for coursework outside physics. Most of our majors find a "second love" and take a minor or second major in that field. A surprising number of physics majors are musicians and take lessons or join performance groups. We support the Notre Dame commitment to educating the whole student—you will receive a true liberal education, not just job training.

Can I double major?

Yes! Roughly one-third of our majors have a second major. The most common is math, but successful options have included anthropology, philosophy, theology, computer science, foreign languages, and others.

Can I go abroad?

Yes! The major is designed so that the spring of junior year can be taken abroad, and about half of the physics majors take advantage of that time to go to London, Rome, Dublin, Chile, Toledo, or other points. It is harder for physics pre-meds to go abroad, but it can be done with careful planning.

Do I take physics courses abroad?

It depends. Students going to University College (Dublin) for a semester, or to Trinity, Oxford, or Cambridge Universities for a year will take math and physics courses while abroad. Students at other sites usually do not, unless we web broadcast a Notre Dame course (which we often do).

Can I do research during the semester?

Yes! The majority of our majors do research in our department or in allied departments. Research opportunities for pay or credit abound, and we encourage our majors to get into research as early as freshman year.

Can I do research during the summer?

Yes! By the end of sophomore year, most majors have lined up summer research positions, either at Notre Dame or elsewhere. Notre Dame is one of the oldest and largest participants in the National Science Foundation's Research Experience for Undergraduates (REU) Program. Students can live in dorms at no cost while getting paid to do research. Or you can pick an institution close to home or in some exotic locale to spend your summer doing research. We even send students to Europe for their summer research.

Is there a senior thesis?

Not a required one, unless you are in the Honors Program. However you may write one if you like and we are working on creating an "honors" version of the Physics degree for those that do a thesis.

Can I have a social life?

Like all science majors, physics students do have a strenuous workload, especially in the sophomore and junior years, but the camaraderie among the majors is high and most find ample time to play sports, join musical groups, or pursue outside interests. The faculty and majors also like to get together for dinner parties, barbecues, and pool tournaments, or just to hang out in the physics majors' study lounge. Come join us!

How can I get more information?

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