About the University

Founded in 1857, Illinois State University was the first public university in the state and is one of the Midwest's oldest institutions of higher education. It is a coeducational, residential university with an emphasis on undergraduate study. Its 34 academic departments in six colleges offer 66 undergraduate programs in more than 160 fields of study. The Graduate School coordinates 30 master's, two specialist, and eight doctoral programs.

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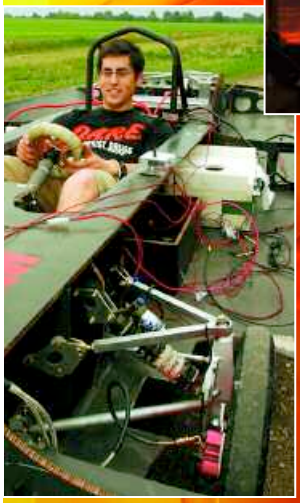
ILLINOIS STATE UNIVERSITY

PHYSICS

Individual attention...National recognition



Computer physics

Engineering physics

Physics

Physics teaching

ILLINOIS STATE UNIVERSITY

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The Illinois State University Physics Department offers unique and nationally recognized degree sequences for undergraduates. National surveys have shown that physics graduates from undergraduate-only programs express the highest level of satisfaction.

Experience physics at Illinois State

- Work with 15 faculty and teaching staff members
- Associate with approximately 130 other physics majors
- Benefit from a less-than-10:1 student-to-faculty ratio
- Attend small classes with plenty of individualized attention
- Collaborate with faculty conducting research
- Participate in a wide range of out-of-classroom activities such as Physics Club and the Solar Car Team

We currently average 18 graduates per year, which puts Illinois State in the top 10 undergraduate-only programs on a national basis. The Illinois State Physics Department is small enough to provide individualized attention, yet big enough to deliver large-university opportunities.

Physics—the common core

The Physics Department offers four different sequences of study within the major, all of which provide flexible career preparation: **computer physics, engineering physics, physics, and physics teaching.**

These four sequences have nearly identical plans of study during the first two years, including the following set of core courses:

- 107: Frontiers of Physics
- 110: Physics for Scientists and Engineers I
- 111: Physics for Scientists and Engineers II
- 112: Physics for Scientists and Engineers III
- 217: Methods of Theoretical Physics
- 220: Mechanics I
- 270: Experimental Physics

A wide variety of elective courses is also available for those pursuing special interests. Details about all our degree sequences and required and optional courses can be found on our Physics Department Web site at www.phy.ilstu.edu/programs.

Opportunities

As a physics major, you'll find yourself a member of a select peer group. Physics majors are among the most capable on campus and prove it regularly by earning scholarships and awards. Not only are there opportunities for campus-wide scholarships such as the Presidential, Provost, and Minority Scholars programs, but the Physics Department also offers many significant freshman scholarships—for majors only—each year. Annually, we provide achievement-based department awards for current majors, and our majors regularly receive college, university, and sometimes even national awards. More details can be found on our Web site by following links from www.phy.ilstu.edu/opportunities.

Freshman scholarships

Each fall, the Physics Department awards merit-based scholarships to incoming freshmen in any physics degree sequence:

- The Robert D. Young Physics Scholar Award $2,000
- The Physics Alumni Scholar Award..... $1,000
- The Dale M. Shulaw Physics Scholar Award $1,000
- Physics Freshman Scholar Book Awards $500

These scholarships are awarded based on students' academic records and a short application available online.

Awards

For majors beyond the freshman year, we have a wide spectrum of funded awards available, recognizing achievement and service with monetary awards, including our highest award, the Michael F. Canney Scholarship. Many students of all levels also enjoy competing in the Skadron Prize computer physics competition. The best computer simulations solving each year's problem earn their authors cash prizes.

Undergraduate research

One of our specialties is involving undergraduates in forefront research projects. Over many years of experience, we have learned how to select appropriate research topics and teach students to be productive members of our research teams. As a research assistant, you'll be exploring new knowledge and solving problems that aren't in any textbook. You'll experience how science is really done as an active collaborator.

Our student researchers have a long list of achievements of which we are truly proud, including receiving national awards for their projects, presenting their work at scientific meetings, and even co-authoring journal articles. You can choose to work on a research project for academic credit or for a paid stipend—either way, we encourage you to join the exciting world of undergraduate research.

Computer physics

A rapidly growing new approach in which computers are used to simulate and explore physical phenomena

Most of our faculty members are computational physicists and use computers to explore the physics of laser-matter interactions, the nature of materials, the Earth's space environment, nonlinear chaotic processes, and bio-optical imaging. Our department was among the very first in the nation to introduce computers into its curriculum, and in 1997 the Department of Energy recognized our computer physics sequence as one of the most innovative in the United States.

As a student in computer physics, you'll take a sequence of project-oriented and team-taught courses. In your junior year you'll take Methods of Computational Science, an award-winning course giving you a thorough overview of how computers can be used in physics, chemistry, and biology. In your senior year you'll take Advanced Computational Physics—team-taught by three faculty members—which deals with computer applications in their frontier research areas. This is followed by a research project working with a faculty member and topic of your choice.

Computer physics curriculum

- 165: Programming for Scientists
- 240: Electricity and Magnetism I
- 254: Hardware and Software Concepts
- 284: Quantum Mechanics I
- 318: Methods of Computational Science
- 325: Thermal Physics
- 388: Advanced Computational Physics
- One course from
  - 320: Mechanics II
  - 340: Electricity and Magnetism II
  - 384: Quantum Mechanics II

One elective course from 300-level physics courses

Some recent computer physics alumni

- Shelley L. Dexter '02, project planner, STL Technologies, Bloomington
- Kimberly N. McGill '05, health physics consultant, Stan A. Huber Consultants Inc., New Lenox
- Nathaniel G. Nutter '06, Ph.D. graduate student in oceanography, University of Washington, Seattle
- Tyson R. Shepherd '03, Ph.D. graduate student in bioscience, University of Iowa, Iowa City
- Robert E. Wagner '02, Ph.D. graduate student in physics, Princeton University, Princeton, New Jersey

Engineering physics dual degree

A program in which students earn a B.S. degree in physics from Illinois State and a B.S. degree in an engineering discipline from another institution

Students spend their first three years in our department before transferring to the partner institution for two more years of study. Careful advising from a physics faculty member helps the student satisfy the degree requirements at both universities.

This program combines the strengths of our department—personal attention from faculty, small class size, computer expertise, and nationally recognized research opportunities—with top-notch engineering programs that make cutting-edge technology available to our students as they finish their degrees. Beginning students progress through junior-level courses in mechanics, electromagnetism, and quantum mechanics in a rigorous but student-friendly environment. Their later engineering courses build on this strong foundation, adding extra value—and another degree—to the new engineer's resume.

Engineering physics curriculum

- 140: Chemistry I
- 141: Chemistry II
- 152: Engineering Statics
- 240: Electricity and Magnetism I
- 284: Quantum Mechanics I

17 additional hours (5–6 courses):

Approved junior/senior engineering courses to be transferred from your engineering university (e.g., University of Illinois, Bradley University).

Some recent engineering physics alumni

- Joshua P. Matsko '01, mechanical engineer, Naval Surface Warfare Center Combatant Craft Division, Norfolk, Virginia
- Tony J. Piraino '05, engineer, Caterpillar Motor Grader Systems Integration Team, Decatur
- Kent A. Schonert '04, engineering technician, Firefly Energy, Peoria
- Sarah E. Schonert '06, associate engineer, Caterpillar Inc., Mossville

Physics

A broad-based major designed for students who want maximum flexibility after graduation

If you're curious about how the universe works and don't have a particular specialization in mind, the physics sequence is for you. You'll learn the fundamental laws of physics: motion, electromagnetism, quantum physics, thermodynamics, and statistical mechanics. These physical laws provide the foundation underlying other science disciplines and the various engineering fields. You'll gain skills in the three key methods of exploring science and engineering problems: experiments, theory, and computer simulation. You will graduate with the ability to "think like a physicist"—a powerful facility to distill problems to their simplest form, after which you'll have the means to find solutions.

A physics degree from Illinois State will serve you well no matter which direction you go after college. In the past few years our majors in the physics sequence have gone on to top graduate schools in science and engineering, have been hired in a wide variety of engineering and technical positions, and have been quite successful in professional schools such as law and medicine.

Physics specialty courses

- 140: Chemistry I
- 141: Chemistry II
- 240: Electricity and Magnetism I
- 270: Experimental Physics (three semesters total)
- 284: Quantum Mechanics I
- 325: Thermal Physics
- 340: Electricity and Magnetism II
- 384: Quantum Mechanics II

Two elective courses to be chosen from 300-level physics courses

Some recent physics alumni

- Michael S. Bell '04, Ph.D graduate student in physics, University of Illinois at Urbana-Champaign
- Garnet B. Erdakos '97, Ph.D., research associate in environmental and biomolecular systems, Oregon Graduate Institute, Beaverton, Oregon
- Adam D. Hall '04, medical student, Southern Illinois University School of Medicine, Springfield
- Kevin M. Paul '96, Ph.D., accelerator physicist, Fermi National Accelerator Laboratory, Batavia
- Zachary A. Schaefer '04, physicist, Northrop Grumman's Electronic Services and Defensive Systems Division, Rolling Meadows
- Zachary J. Smolinski '96, patent attorney, Panduit Corporation, Tinley Park

Physics teaching

Preparing candidates for positions in high school science teaching

This is a career with a large and growing demand as "baby boomer" teachers retire and the percentage of students who take high school physics continues to increase. Many of our students land jobs before the end of student teaching.

As a physics teaching major, you'll be part of a nationally recognized program noted for the breadth and depth of its teacher candidate preparation. With six physics teaching methods courses and a full-time program coordinator, you'll be part of what has grown to be perhaps the largest undergraduate teaching program in the nation. Because of its size and staffing, your plan of study will provide exceptional learning opportunities not available elsewhere at the undergraduate level. You'll begin your teaching experience with a service-learning project during the fall of your sophomore year. By the time you have completed all required coursework, you will be well grounded in fundamental physics, knowledgeable about the science education reform movement, experienced with a variety of laboratory equipment and classroom settings, and extremely well positioned for future professional advancement. If you want to have a direct positive impact on the quality of life of other people, consider becoming a physics teacher.

Physics teaching specialty courses

- 140: Chemistry I
- 141: Chemistry II
- 205: Origin of the Universe
- 209: Introduction to Teaching High School Physics
- 240: Electricity and Magnetism I ***or*** 284: Quantum Mechanics I
- 302: Computer Applications in High School Physics
- 310: Readings for Teaching High School Physics
- 311: Teaching High School Physics
- 312: Physics Teaching from the Historical Perspective
- 353: Student Teaching Seminar

Some recent physics teacher education alumni

- Dave P. Eddy '04, physics teacher, Stevenson High School, Lincolnshire
- Shannon M. Hughes '02, physics teacher, Barrington High School, Barrington
- Zachary A. Metzger '06, physics teacher, Riverside-Brookfield High School, Riverside
- Gary G. Shepard '04, physics teacher, Osceola High School, Tampa, Florida
- Michelle A. Tantillo '05, physics teacher, Prospect High School, Mount Prospect