

PHYSICS



Excellence in Action

COLLEGE OF ARTS AND SCIENCES

The Department of Physics at Kent State University offers four-year programs with various options leading to the Bachelor of Science and Bachelor of Arts degrees. Advanced students can pursue graduate programs leading to the Master of Science, Master of Arts and Ph.D. degrees.

The total physics program at Kent State is small enough to assure individualized attention to each student, yet large enough to offer the full spectrum of courses and opportunities characterizing a graduate research institution. Advanced undergraduate physics majors work alongside doctoral-level graduate students and faculty researchers of international reputation in such fields as condensed matter physics and nuclear physics. Research grant support and recent state excellence grants have further enhanced Kent State University's Liquid Crystal Institute® and its Center for Nuclear Research, in addition to supporting an initiative in high-temperature superconductivity.

DESCRIPTION OF PROGRAMS

The undergraduate physics programs are built around core courses that provide solid preparation in the fundamentals of math and physics but still allow elective selections. Several degree programs are offered.

BACHELOR OF SCIENCE

This professionally oriented degree serves as preparation either for graduate work in physics or for entrance into positions in a variety of industries and government service. In order to earn this degree, students must complete 56 semester hours of core physics, chemistry and mathematics courses, plus additional hours from one of the seven concentrations below:

RESEARCH CONCENTRATION

The research concentration prepares majors for further study at the graduate level. This program trains students in logical thinking and problem solving using both analytical and computational methods. It also furnishes students with a comprehensive understanding of the basic laws and principles that govern the physical world.

APPLIED PHYSICS CONCENTRATION

The applied physics concentration prepares students for immediate entry into careers in industry. While rooted in the basic principles of physics, this program is optimized for students concerned with the application of physics in practical devices and systems.

CHEMISTRY CONCENTRATION

This concentration is designed for students with a strong interest in both physics and chemistry who may wish to prepare for graduate study in chemical physics or for work in a high-technology materials-related research and development laboratory. This program satisfies requirements for a minor in chemistry.

BIOLOGICAL SCIENCES CONCENTRATION

This concentration is designed for students with a strong interest in both physics and biological sciences, who may wish to prepare for graduate study in biophysics or for work in a biotechnology company. This program satisfies requirements for a minor in biological sciences.

COMPUTER SCIENCE CONCENTRATION

This concentration provides a foundation in physics while emphasizing the use of computer software in scientific applications. Graduates are prepared for computer-related careers that require an understanding of the underlying science as well as knowledge of relevant computer applications. This program satisfies requirements for a minor in computer science.

APPLIED MATHEMATICS CONCENTRATION

The applied mathematics concentration provides students with a strong understanding of applied physical theory, its applications and the underlying mathematics. This program satisfies requirements for a minor in applied mathematics.

PRE-MEDICINE/PRE-OSTEOPATHY CONCENTRATION

This concentration is designed to prepare physics majors for further study leading to careers in medicine.

BACHELOR OF ARTS

Such varied fields as secondary education, patent law or interdisciplinary science can be approached with the Bachelor of Arts degree. A large proportion of elective courses allows the student to complete a second major in such fields as biology, botany, chemistry, English, geography, geology, mathematics, philosophy, political science or psychology in preparation for an interdisciplinary career. It is also possible to enter graduate work in physics after completing this program.

CAREER OPPORTUNITIES

Most physicists are employed by educational institutions, industrial firms, government laboratories or federally funded research and development centers. By combining the study of physics with another field or related science, graduates can pursue careers in administration, astrophysics, biophysics, computer technology, electronics, engineering, food processing/packaging, geophysics, health services, instrument design, laser technology, liquid crystal technology, manufacturing, medical physics, medical technology, metallurgy, nuclear studies, radiation safety, research and development.

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MASTER OF ARTS

An M.A. degree is offered requiring 32 semester hours of graduate credit. This degree program does not require a thesis.

MASTER OF SCIENCE

The Department of Physics offers an M.S. degree in physics. A thesis presenting results of original work is required. This program requires a total of 32 semester hours, which includes six hours of thesis.

DOCTOR OF PHILOSOPHY

Those students seeking to become professional physicists may apply for admission to the Ph.D. program. A dissertation presenting results of original research is required, in addition to a set of basic courses outlined in the Departmental Information and Policy Guide. Topics available for dissertation research are primarily in the areas of condensed matter physics, high-energy nuclear physics and theoretical biophysics. Students in the Ph.D. program are required to present at least one seminar during their graduate career.

SPECIAL DEPARTMENTAL PROGRAMS

LIQUID CRYSTAL INSTITUTE®

Some physics faculty are part of Kent State University's Liquid Crystal Institute®, the only one of its kind devoted exclusively to research on the liquid crystalline state of matter. The research program is interdisciplinary and involves some 50 researchers who study the basic properties of liquid crystals and their use in displays and optical devices. Physics faculty also address other systems within the wider field of complex fluids, including films, foams and biological systems. Experimental, theoretical and computational research complement each other in all of these fields.

CENTER FOR NUCLEAR RESEARCH

Nuclear physics research at Kent State University is coordinated through the Department of Physics Center for Nuclear Research. Two main thrusts are studies of the quark-gluon basis of nuclear particles and studies of nuclear matter at high temperature

and density where a quark-gluon plasma may form. This is an excellent environment for the training of young physicists in experimental, theoretical and computational techniques.

HIGH-TEMPERATURE SUPERCONDUCTIVITY AND LOW-TEMPERATURE PHYSICS

Theoretical and experimental studies of the new high-temperature superconductors and experimental studies approaching absolute zero provide other forefront areas of research in which undergraduates may become involved through individual investigations or senior honors projects.

PLANETARIUM

The physics building houses the Planetarium, which provides public shows, shows for special groups and presentations for undergraduate classes.

SOCIETY OF PHYSICS STUDENTS

Social and intellectual activity is provided by the Society of Physics Students, a professional association designed for students. Typically, meetings are held weekly with refreshments provided by the Department of Physics. The department also provides physics students with a computer room and a spacious study room.

SCHOLARSHIP AWARDS

A four-year renewable Honors Scholarship in physics is awarded annually to one or two entering freshman physics majors. Other awards include the John Wiley Award for outstanding performance in introductory physics and the Addison Wesley Award for the outstanding graduating physics major.

Physics

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For information on all of Kent State's degrees and majors, go online to www.kent.edu/gps.