

PROGRAMS

MAJORS

- Coastal Engineering
- Engineering Physics
- Physics
 - General Physics
 - Astronomy & Astrophysics
 - Microelectronics
 - Secondary Education
 - Dual Degree Engineering Transfer Program

MINORS

- Physics
- Mechanical Engineering

Why Physics?

The pursuit of physics is to understand and explain how nature works, from the unimaginably small world of atomic particles to the fantastically vast realm of galaxy clusters. Physicists observe nature and try to categorize and understand the phenomena they observe. Physics is a basic science that is the foundation of many other scientific disciplines and therefore has an important impact on almost all the problems facing modern society. Many people think that physics is something new—but it started before recorded history when people first discovered recurring relationships in

the environment. Through careful observation of these relationships and because of nature's dependability, they found they could make reliable predictions that would seem to give them some control over their surroundings. Physicists solve problems and make discoveries directly through research and indirectly by teaching and inspiring others to look for explanations for the events happening in the physical universe.

The Physics Program

The Physics Department offers a multi-track program of study, giving students the flexibility to pursue a challenging curriculum of inspiring courses best suited to their individual dreams and chosen career. A major in physics prepares students for careers in a variety of high-technology fields, teaching and further graduate studies in physics, engineering, medicine and other fields. Students can complete the physics major in one of seven tracks: general physics, astronomy and astrophysics, coastal engineering, engineering physics, microelectronics, secondary education and dual-degree engineering transfer program.

Physics Research

Taking classes is not the only experience available in physics. We provide undergraduate research opportunities because they are important to the advancement of student understanding, allowing the student to apply the techniques that

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COASTAL ENGINEERING MAJOR

Prepares students to address the needs of coastal communities as related to sea-level rise, beach replenishment, dredging, sediment management, coastal structure analysis and design, wetlands and marsh stabilization and restoration, hydrology, ports, jetties, inland waterways, and energy matters.

PHYSICS MAJORS

Find the Right Track

Specialized tracks for the physics degree:

- **General Physics:** Provides skills and training needed to work in government and industry or pursue advanced degrees in physics and engineering. Choose from a number of areas of study, including astrophysics, digital and analog electronics, or engineering.
- **Astronomy and Astrophysics:** Provides broad knowledge of physics and astronomy to prepare students interested in pursuing a graduate degree in astronomy and astrophysics. Provides skills and training to work at national observatories, astrophysical data centers or in astronomy-related private industry.
- **Microelectronics:** Provides skills and training in digital and analog electronics, computer architecture and design, computer programming and interfacing, and robotics. Provides skills necessary to enter the workforce directly after obtaining the bachelor's degree.
- **Secondary Education:** For the student who wants to teach middle or high school physics. In addition to the core physics and math courses, students take classes in astronomy, biology, geology and earth science, laboratory safety, classroom management, science and reading methods, inclusive instruction, and technology in education. Students are required to do a teaching internship and pass the Praxis II exam for graduation.
- **Dual Degree Engineering Transfer Program:** The dual-degree engineering transfer program offers the opportunity to earn both a degree in physics from SU and an engineering degree from an ABET (Accreditation Board for Engineering and Technology) accredited engineering school. Students normally attend SU for three years and an engineering school for two years. While at SU, a student must complete a minimum of 90 credit hours, including all required General Education courses, the physics core and appropriate engineering courses. Students must apply for admission and be accepted to an ABET accredited engineering school.

ENGINEERING PHYSICS MAJOR

Provides skills and training in various areas of mechanical and electrical engineering, including thermodynamics, materials, fluid mechanics, acoustics, digital and analog electronics and computer architecture. Prepares graduates for direct entry into the workforce or to pursue graduate programs in mechanical or electrical engineering.



“SU physics prepared me for my career in electronics by providing hands-on instruction in a fun atmosphere. The professors are down to earth people with top-notch expertise in their fields.”

— Jessica (Thompson) McCarthy, NASA Electrical Engineer

Make Tomorrow Yours

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“SU physics provided me with all the necessary skills to enter into and contribute to a successful cancer treatment group.”

— Douglas Vile, Medical Research Assistant

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an active hands-on environment promotes. With close faculty mentoring during the research experience, the students gain skills necessary to organize and communicate scientific results and become successful science professionals. Virtually all physics majors become involved in scientific research related to current topics under active investigation within the scientific community and industry. Students have conducted research on a variety of topics including extragalactic elemental abundances, stellar evolution and supernovae, robotics building and design, alternative energies such as wind and solar, computational surface physics, biomedical physics, quantum mechanics, remote sensing, high-altitude balloon electronics, and a plethora of other scientific topics.

Our Mission

The faculty’s mission is to prepare students to work confidently and effectively in physics or a related field, to develop the power to think critically, judge soundly and communicate effectively. With the assistance of physics faculty advisors, each student selects a program of theoretical and experimental courses. Students gain an understanding of the broad range of principles which characterize the discipline of physics. Additionally, students acquire the ability to apply theoretical and experimental techniques to explore a wide variety of ideas. Faculty have a personal interest in the success of

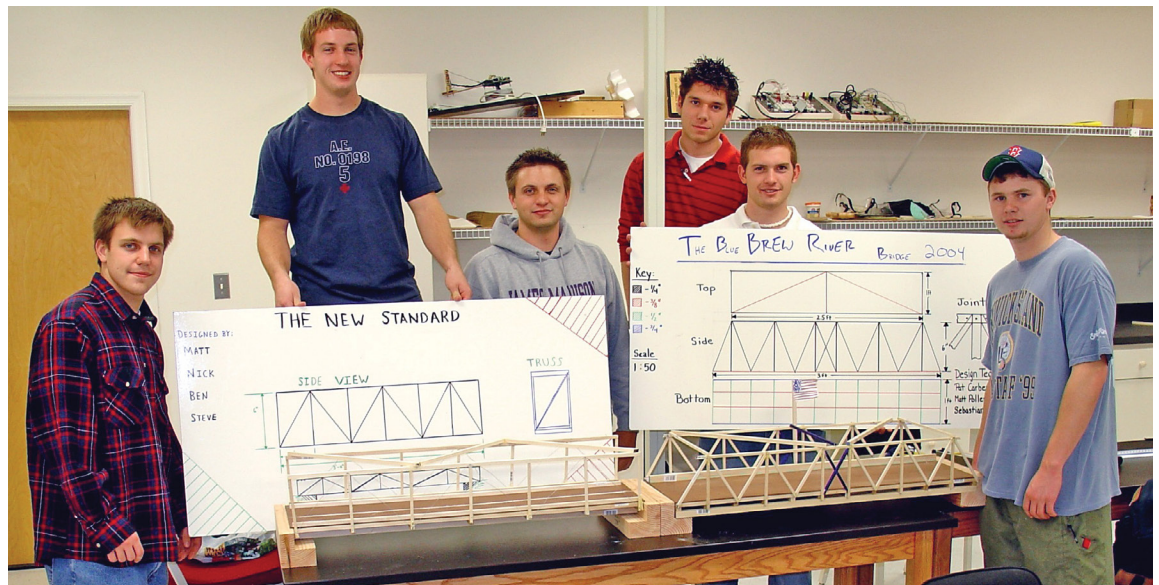
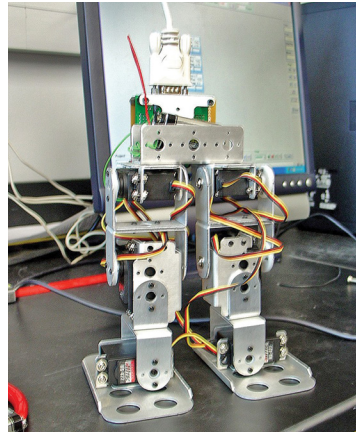
students and mentor students as they progress to a degree.

A Diverse Field

Diversity among faculty and students is not only respected but encouraged because physics is an interdisciplinary field that relies on a diverse spectrum of individuals and ideas. The Physics Department values global, societal and individual differences and has a commitment to equal opportunity.

A Perfect Fit

The department is relatively small, and upper-level major courses rarely have more than 15 students. We support an environment that encourages student involvement, faculty-student interaction and close student-student collaboration with a central idea that physics courses should include hands-on activities integrated with discussions and lecture. In such integrated courses, the traditional notions of lecture, laboratory, computer simulation and other classroom activities are fully blended in practice and conception and are not individual separate entities.



“The knowledge and skills I received from SU physics opened unbounded possibilities, landing me a world traveling position at NASA and preparing me for a master’s degree.”

— Sebastian Stewart, NASA Instrument Engineer

FACULTY

Chair

- Associate Professor
Steven Binz, Ph.D.
Iowa State University

Associate Chair

- Associate Professor
Matthew A. Bailey, Ph.D.
Utah State University

Professors

- Asif Shakur, Ph.D.
University of Calgary
- Mark W. Muller, Ph.D.
University of Hawai’i

Associate Professors

- Jeffrey W. Emmert, Ph.D.
University of Virginia
- Joseph W. Howard, Ph.D.
University of Oklahoma
- Nicholas Troup, Ph.D.
University of Virginia

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CONTACT INFORMATION

For information on the
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410-543-6480

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