

PHYSICS

What can I do with this major?

AREAS

EMPLOYERS

STRATEGIES

Some areas of specialization follow. Most students specialize at the graduate level.

ACOUSTICAL PHYSICS

Development
Testing
Consulting
Administration
Education

Colleges and universities
Military
Government laboratories
Nonprofit research centers
Industry e.g., electronics, building design, medical instrumentation, communications, engineering, noise pollution, petroleum, sound recording, film production

Supplement program with courses in engineering, environmental science, urban planning, remote sensing, physiology, performing arts, audio broadcasting, speech communication, film production, or other areas of interest.
Seek internship experience in your specialty area.
Stay abreast of federal, state, and local environmental regulations for the environmental impact positions.
Become familiar with technologies used to measure/monitor noise levels.
Obtain a graduate degree for additional opportunities in industry and education.

ASTRONOMY

Research
Consulting
Writing
Public Relations
Education

Observatories
Laboratories
Planetariums
Science museums
Nonprofit foundations
Colleges and universities
Industry e.g., aerospace, scientific supply, computer software, remote sensing, communications
Federal government: National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, Federal Aviation Administration, U.S. Naval Observatory, U.S. Naval Research Laboratory

Obtain experience through part-time or voluntary position in a planetarium, observatory, or science museum.
Cultivate broad knowledge of astronomy and speaking skills for jobs working with the public.
Develop strong writing skills for preparing scientific reports.
Seek undergraduate research opportunities with professors in the field.
Develop a specialty area of expertise such as remote sensing, instrumentation, computer applications, etc.
Obtain a Ph.D. for teaching and advanced research positions.

AREAS

EMPLOYERS

STRATEGIES

ASTROPHYSICS

Consulting
Administration
Research

Research centers
Colleges and universities
Observatories
Planetariums
Aerospace industry
Scientific supply industry
Federal government: Military, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration (NOAA), Federal Aviation Administration (FAA)
Airports

Seek lab courses for direct experience with equipment and observatory tools.
Participate in research with scholars in the field.
Complete an internship with a research organization or related industry.
Develop computer and oral and written communication skills.
Learn to be effective in both independent research role and team environment.
Earn an advanced degree for most teaching and research positions.

BIOPHYSICS

Basic and Applied Research
Development
Consulting
Administration

Colleges and universities
Medical and dental schools
Government laboratories
Nonprofit research centers
Industry e.g., biotechnology, environment, pharmaceuticals, food science, toxicology
Hospitals

Biophysics is considered an interdisciplinary field at the undergraduate level; most students prepare to enter by majoring in physics, chemistry, or mathematics with supplementary courses in biology or by majoring in biology, biochemistry or molecular biology with supplementary courses in chemistry, physics, and mathematics.
Plan to specialize in an area such as experimental biophysics or computational biophysics and choose courses accordingly.
Seek research experience through work with a professor or internships.
Earn a bachelor's degree for most technician positions.
Obtain advanced degree for higher-level positions in industry in academia.

CHEMICAL PHYSICS

Basic and Applied Research
Administration

Colleges and universities
Government laboratories
Government agencies
Industry

Take courses in physics, chemistry, and mathematics for graduate school preparation in this interdisciplinary field.
Seek undergraduate research experience to develop laboratory and computer skills.
Gain research experience in both physics and chemistry.
Become familiar with the various forms of spectroscopy.
Obtain advanced degree for more opportunities in industry, research, or education.

AREAS

EMPLOYERS

STRATEGIES

CONDENSED MATTER

Basic and Applied Research
Development
Consulting
Administration

Government laboratories
Nonprofit research centers
Colleges and universities
Electronics industry e.g., microprocessors, magnetic imaging, communications, automobile, navigation/guidance systems
Government agencies e.g., National Aeronautics and Space Administration, Department of Defense, Department of Energy

Develop strong mathematical, chemistry, and computer science skills.
Seek research experience through internships or by assisting faculty with projects.
Acquire advanced degree for opportunities in industry, research, or education.
Become familiar with various forms of characterization techniques such as optical and electron spectroscopy and neutron scattering.

ENGINEERING PHYSICS

Engineering (Process and Testing)
Quality Control
Research
Development
Instrumentation
Consulting

Colleges and universities
Government laboratories
Government agencies e.g., Department of Commerce, Department of Defense
Engineering firms
Manufacturing and processing firms
Industry e.g. high technology, chemical, aerospace, agriculture, energy, fuel, computer, transportation
Hospitals

Choose a major in engineering physics or supplement physics major with engineering minor.
Seek internship or co-op experience in area of interest.
Develop strong oral and written communication skills.
Complete applicable certification or licensure through professional organizations.
Pursue advanced degree in engineering, engineering physics, or physics for increased opportunities.

GEOPHYSICS

Basic and Applied Research
Development
Environmental Consulting
Law
Administration

Colleges and universities
Nonprofit research centers
Government e.g., State and Federal Geological Survey, Army Map Service, Naval Oceanographic Office
Government laboratories
Military
Industry e.g., petroleum, mining, hydrogeology
Consulting firms
Law firms

Specialize in geophysics at the undergraduate level or supplement physics degree with geology major or minor.
Develop solid computer, mathematics, chemistry, engineering, and physics knowledge.
Seek experience with national labs or industry researching specializations of interest.
Take business classes for increased marketability in advanced prospecting positions (risk analysis for drilling, mining, exploration).
Maintain good physical condition and be open to travel.

AREAS

EMPLOYERS

STRATEGIES

MEDICAL/HEALTH PHYSICS

Basic and Applied Research
Development
Clinical Service
Consulting
Administration
Monitoring
Enforcement

Colleges and universities
Government laboratories
Government agencies e.g., Department of Defense,
Department of Energy, Nuclear Regulatory
Commission, Department of Health and Human
Services
Nonprofit research centers
Industry e.g., medical instrumentation, nuclear
power, nuclear accelerator, food sterilization,
petroleum
Environmental firms
Hospitals, clinics, medical centers

Gain experience with air and water testing techniques
and analysis and radiation detection instruments.
Develop strong communication skills for training
radiation workers and members of the general
public and for collaborating with physicians in
healthcare settings.
Maintain current knowledge of government standards
and regulations.
Learn medical uses of radiation for work in the
healthcare industry.
Seek certification from the National Registry of
Radiation Protection Technologists for some
positions.
Complete a master's degree and certification by the
American Board of Health Physics (ABHP) for
health physicist positions.
Earn a Ph.D. and certification by the American Board
of Health Physics (ABHP) for top university
teaching, research, and administrative positions.
Gain experience at a hospital or clinic to prepare for
work in healthcare settings; clinical residency
training may be required.

NUCLEAR PHYSICS

Basic and Applied Research
Development
Consulting
Instrumentation
Administration
Law
Quality Control
Operations and Maintenance

Colleges and universities
Military
Industry e.g., security/weapons, nuclear
accelerators, nuclear reactors, nuclear
instrumentation, radioisotope products,
transportation, healthcare, environmental
protection, food irradiation
Government laboratories and research centers
Government agencies e.g., Department of Defense,
Department of Energy

Acquire a strong mathematics, computer science,
and chemistry background.
Choose a theoretical or experimental track.
Seek internship experience in your specialty area.
Pursue master's degree or Ph.D. for advanced
positions in industry.

AREAS

EMPLOYERS

STRATEGIES

OPTICAL PHYSICS

Basic and Applied Research
Development
Consulting
Administration

Colleges and universities
Government laboratories
Nonprofit research centers
Industry e.g., medical scanners, eyeglasses,
binoculars, microscopes, lasers, holography,
display technologies, x-ray, ultraviolet spectra,
fiber optics
Federal agencies e.g., NASA, Department of Energy,
Department of Defense

Gain experience in the optics field through
internships or research with professors.
Supplement program with courses in electricity,
magnetism, quantum mechanics, and electronics.
Obtain a master's degree for positions in industry.
Understand lasing and optical media.

PARTICLE/HIGH ENERGY PHYSICS

Basic and Applied Research
Development
Consulting
Instrumentation
Administration
Operations and Maintenance

Government laboratories
Nonprofit research centers
Colleges and universities

Acquire a strong mathematics, computer science,
and chemistry background.
Choose a theoretical or experimental track.
Seek internship experience in your specialty area.
Pursue Ph.D. for advanced positions in academia.

SCIENCE EDUCATION

Teaching
Computer Software Development
Educational Research
Writing and Editing
Library and Information Sciences

Public school systems, K-12
Private schools, K-12
Publishing companies: books, magazines, videos
Software developers
Libraries

Develop excellent communication skills, verbal and
written.
Gain experience working with age group of interest
through volunteering and tutoring.
Become skilled in the use of computers and
laboratory equipment.
Maintain current knowledge of state and national
legislation regarding teacher licensure.
Acquire appropriate state teacher certification for K-
12 teaching opportunities.
Seek advanced degree required for specialists,
education administration, college teaching, and
other professional positions.

GENERAL INFORMATION

- Physicists are interested in solving complex, technical problems.
- Visit government laboratories or research centers to learn more about opportunities in the field. Schedule informational interviews to learn about the profession and specific career paths.
- Join relevant professional associations. Attend meetings and stay up-to-date on research/publications.
- Acquire excellent oral and written communication skills.
- Gain experience using scientific instruments and equipment. Computer skills are critical.
- Participate in summer research institutes. Submit research to local poster competitions or research symposiums.
- A willingness to relocate is helpful due to limited opportunities in specialized areas.
- A bachelor's degree will qualify for positions as research assistants, high-level technicians, or computer specialists, as well as nontechnical work in publishing or sales.
- An undergraduate degree also provides a solid background for pursuing advanced degrees in other employment areas such as law, business, or accounting.
- A graduate degree and post-graduate experience will allow for more responsibility and advancement in the field of physics.
- An earned doctorate is required for college or university teaching, advanced research, and administrative positions.
- A bachelor's degree and state teacher certification are required for K-12 teaching opportunities.
- Become familiar with government job application process for positions in federal, state, or local government.