

PHYSICS AND ASTRONOMY

Chairperson: Dr. Marc Favata

What is Physics?

The goal of Physics is to understand how everything works at its most fundamental level. Physicists study nature on scales as small as an atomic nucleus to as large as the observable universe. Physics is the cornerstone of other natural sciences (chemistry, geology, biology, astronomy) and is essential to understanding our modern technological society. At the heart of physics is a combination of experiment, observation, and the analysis of phenomena using mathematical and computational tools.

Examples of what physicists study include:

- The properties of fundamental particles (protons, quarks, electrons, neutrinos,...).
- The behavior of dark matter, dark energy, galaxies, and black holes.
- The properties of matter in standard and exotic phases (solids, liquids, plasmas, superconductors, superfluids...).
- The behavior of complex systems (the stock market, cellular locomotion, infectious disease transmission, the motion of galaxy clusters or distant planetary systems).

Why study Physics?

Physicists attempt to understand the fundamental mathematical relationships that govern natural phenomena, and apply those relationships to interesting problems. The main reason to study physics is because you are curious about how the world works. In addition to that knowledge, you gain a set of incredibly useful skills that make you attractive to a wide range of employers.

A physics degree trains you to become an expert problem solver. You will learn to break down a problem into its component parts, and apply advanced mathematics, computing, data analysis, and experimental techniques to arrive at a solution. We also emphasize technical writing and presentation skills, as well as working in teams.

Physics majors are well-prepared for further graduate study in physics or astronomy or employment in a wide-range of sectors including:

- Engineering
- Computer programming
- Finance and management consulting
- Defense and aerospace industry
- High school science teaching
- Journalism or science writing
- Law and government
- Medicine

Employers understand the strong analytical skill set that physics majors bring; physicists get good job offers with salaries comparable to

engineering and computer science majors. Among all disciplines, physics students have among the very highest average scores on the MCAT and LSAT examinations, indicating that a physics degree also provides excellent preparation for law and medical school.

There is an extreme shortage in New Jersey of high school teachers with physics training. Physics majors become well-qualified to teach not only physics but also geoscience, chemistry, and all levels of mathematics. Our graduates regularly get attractive offers from excellent high schools in the region.

Learn more about why you should study physics (<https://www.montclair.edu/physics-astronomy/why-study-physics/>).

Undergraduate

- Physics Major, Astronomy Concentration (B.S.) (<http://catalog.montclair.edu/programs/physics-astronomy-concentration-bs/>)
- Physics Major, Pre-Medical Concentration (B.S.) (<http://catalog.montclair.edu/programs/physics-premedical-concentration-bs/>)
- Physics Major (B.S.) (<http://catalog.montclair.edu/programs/physics-bs/>)
- Physics Major, with Teacher Certification in Physical Science (Preschool-Grade 12) (B.S.) (<http://catalog.montclair.edu/programs/physics-teacher-certification-physical-science-preschool-grade-12-bs/>)
- Physics Major (B.S.) (Combined B.S./M.A.T. Teaching with Teacher Certification in Physical Science (Preschool-Grade 12) and Teacher of Students with Disabilities) (<http://catalog.montclair.edu/programs/teacher-certification-physical-science-preschool-grade-12-students-disabilities-combined-bs-mat/>)
- Physics Major, with Teacher Certification in Physics (Preschool-Grade 12) (B.S.) (<http://catalog.montclair.edu/programs/physics-teacher-certification-preschool-grade-12-bs/>)
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- Physics Major (B.S.) (Combined B.S./M.B.A. Business Administration) (<http://catalog.montclair.edu/programs/physics-combined-bs-mba/>)
- Physics Major (B.S.) (Combined B.S./M.S. Applied Mathematics) (<http://catalog.montclair.edu/programs/physics-combined-bs-ms-applied-math/>)
- Physics Minor (<http://catalog.montclair.edu/programs/physics-minor/>)