



DEPARTMENT OF PHYSICS
UNIVERSITY OF CALIFORNIA
SANTA BARBARA, CA 93106-9530

Learning Outcomes for Students Receiving a B.A. or B.S in Physics:

Students graduating with a BA or BS in Physics should be able to

- Apply the basic laws of physics in the areas of classical mechanics, Newtonian gravitation, special relativity, electromagnetism, geometrical and physical optics, quantum mechanics, thermodynamics and statistical mechanics.
- Recognize how observation, experiment and theory work together to continue to expand the frontiers of knowledge of the physical universe.
- Apply basic mathematical tools commonly used in physics, including elementary probability theory, differential and integral calculus, vector calculus, ordinary differential equations, partial differential equations, and linear algebra.
- Use basic laboratory data analysis techniques, including distinguishing statistical and systematic errors, propagating errors, and representing data graphically.
- Convert a physical situation articulated in English to a mathematical formulation, and then analyze it quantitatively.
- Exercise the use of physical intuition, including the ability to guess an approximate or conceptual answer to a physics problem and recognize whether or not the result of a calculation makes physical sense.
- Access information on a topic from a variety of sources, and be able to learn new things on one's own.

In addition, students graduating with a BS should be able to

- Apply more advanced mathematical tools, including Fourier series and transforms, abstract linear algebra, and functions of a complex variable.
- Use classic experimental techniques and modern measurement technology, including analog electronics, computer data acquisition, laboratory test equipment, optics, lasers, and detectors.
- Communicate verbally, graphically, and/or in writing the results of theoretical calculations and laboratory experiments in a clear and concise manner that incorporates the stylistic conventions used by physicists worldwide.