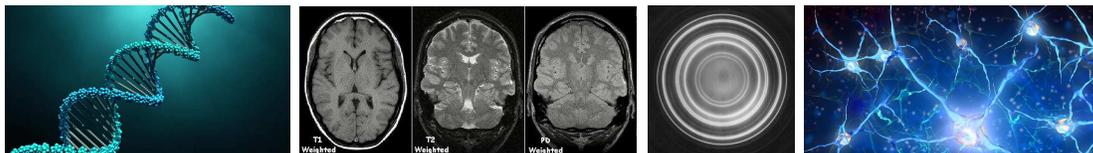


The Physics Minor for Biology Majors

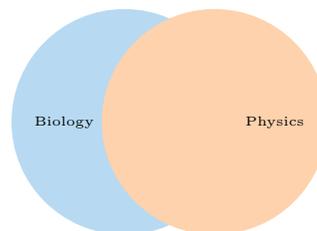
http://physics.neiu.edu/degree_programs/minor.html



1 Biology and Physics

Whether you want to broaden your knowledge, gear up for biophysics, or explore ways to make yourself more marketable, a physics minor may be right for you.

Biology and physics are interconnected and complementary disciplines. Physics underlies a large body of tools used in the medical and biological sciences, from the medical imaging of organs to the techniques of microscopy and spectroscopy used to examine the structures within cells and even single biomolecules.



Venn and the art of physics minoring.

- Link: Biophysical Society

2 Minor Requirements

Five courses are required for a physics minor. As a biology major, you already take two of those. The remaining three courses will complement and reinforce what you are learning in biology. In addition, they satisfy ELE-DS requirements needed for graduation.

- **PHYS-206L University Physics I with Lab**, 5 cr. This course also satisfies the distributed learning requirement NSL.
- **PHYS-207L University Physics II with Lab**, 5 cr. This course also satisfies the distributed learning requirement NSL.
- **PHYS-305 Modern Physics I**, 3 cr. This course also satisfies the Engaged Learning Experience requirement ELS-DS.
- **PHYS-306A Modern Physics II**, 3 cr. This course also satisfies the Engaged Learning Experience requirement ELS-DS.
- **Any** 300-level physics elective worth at least 3 cr. We suggest one of:
 - PHYS-330 Optics, 4 cr.
 - PHYS-340 The Science of Sustainable Energy, 3 cr.

3 Selected Course Descriptions

PHYS-206L University Physics I with Lab, 5 cr. This is the first term of a two-term calculus-based lecture and laboratory sequence intended for students majoring in physics, biology, chemistry, earth science or mathematics: PHYS-206L and PHYS-207L. Kinematics and dynamics of a particle and systems of particles, momentum, energy, angular momentum, conservation laws, applications to problems involving collisions, oscillatory motion and motion in a gravitational field, rigid body motion, temperature, heat, the laws of thermodynamics, application to thermodynamic engines, and ideal gases are discussed. Lecture: 3 hrs. Lab: 2 hrs. General Education (NSL). Prerequisites: MATH-187 Minimum Grade of C, or concurrent registration in MATH-187.

PHYS-207L University Physics II with Lab, 5 cr. This is the second course of a two-term calculus based lecture and laboratory sequence intended for students majoring in physics, biology, chemistry, earth science or mathematics. Charges, Coulomb's and Gauss's laws, conductors and dielectrics, Ohm's law, magnetic fields, Ampere's law, motion of charges in a magnetic field, Faraday's law, inductance, simple L.R.C. circuits, magnetic properties of matter, electromagnetic waves, kinematics of wave motion, reflection, refraction, interference, and diffraction are discussed. Lecture: 3 hrs. Lab: 2 hrs. General Education (NSL). Prerequisites: (PHYS-201 Minimum grade of C and MATH 187). Minimum grade of C or (PHYS-206 Minimum Grade of C or PHYS-206L Minimum Grade of C).

PHYS-305 Modern Physics I, 3 cr. This course covers the advances made in the discipline of physics during the first half of the twentieth century that continue to drive the technologies we use today. Topics that will be covered include an introduction to the theory of relativity, elementary quantum theory, and its applications to atomic, molecular and nuclear physics. ELS-DS Prerequisites: PHYS-207L or PHYS-207 or PHYS-202L or PHYS-202 minimum grade of C. MATH-202 minimum grade of C.

PHYS-306A Modern Physics II, 3 cr. Modern Physics II is the second part of a two course sequence covering advances made in physics during the twentieth century. This content includes aspects of the general theory of relativity, cosmology, thermal physics, and applications of elementary quantum theory to atomic physics, molecular physics, nuclear physics, particle physics and condensed matter physics. ELS-DS Prerequisites: PHYS-305, minimum grade of C.

PHYS-309 Computing for Scientists, 3cr. Introduction to the use of computers in modeling scientific problems; modern programming languages are introduced and used to model several phenomena in the natural sciences and engineering. Prerequisites: MATH-187 minimum grade of C or consent of instructor.

PHYS-331 Optics, 4 cr. The fundamental principles of geometrical and physical optics and their application to the design of modern instruments as well as atomic spectra, properties of photons, and lasers. Principles discussed in the lecture will be explored in various lab exercises. Lecture 2 hours, Lab 4 hours. Prereq.: [PHYS-207 or PHYS-202], PHYS-204, and MATH-202.