PHYSICS MAJOR

Students must also complete the Undergraduate Registration Requirement (https://catalogs.northwestern.edu/undergraduate/requirements-policies/undergraduate-registration-requirement/) and the degree requirements of their home school.

The physics major is designed to help students acquire a broad and varied background in physics and related fields; it provides an excellent intellectual foundation for many careers. The three basic steps toward completing the major are fulfilling prerequisites in introductory physics and calculus; taking a core sequence (common to all concentrations) of physics and mathematics; and completing a course concentration.

Course | Title
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MATH 220-1 & MATH 220-2 | Single-Variable Differential Calculus and Single-Variable Integral Calculus
or MATH 218-1 & MATH 218-2 | Single-Variable Calculus with Precalculus and Single-Variable Calculus with Precalculus
PHYSICS 140-1 & PHYSICS 140-2 | Fundamentals of Physics and Fundamentals of Physics
& PHYSICS 140-3 & PHYSICS 140-4 | and General Physics Laboratory
& PHYSICS 136-1 & PHYSICS 136-2 | and General Physics Laboratory
& PHYSICS 136-3 & PHYSICS 136-4 | and General Physics Laboratory
or PHYSICS 135-1 & PHYSICS 135-2 | General Physics
& PHYSICS 135-3 | and General Physics
& PHYSICS 136-1 | and General Physics Laboratory
& PHYSICS 136-2 | and General Physics Laboratory
& PHYSICS 136-3 | and General Physics Laboratory
or PHYSICS 125-1 & PHYSICS 125-2 | General Physics ISP
& PHYSICS 125-3 | and General Physics for ISP
& PHYSICS 126-1 | and Physics for ISP Laboratory
& PHYSICS 126-2 | and Physics for ISP Laboratory
& PHYSICS 126-3 | and Physics for ISP Laboratory

Major Requirements (units vary, depending on math courses and concentration selected)

- 10–11 core courses (depending on math concentration)

Core mathematics and mathematical tools courses listed below or equivalent courses approved by the department:

MATH 230-1 & MATH 230-2 | Multivariable Differential Calculus and Multivariable Integral Calculus
PHYSICS 311-1 & PHYSICS 311-2 | Mathematical Tools for the Physical Sciences and Mathematical Tools for the Physical Sciences
or MATH 240-0 & MATH 250-0 & MATH 351-0 | Linear Algebra and Elementary Differential Equations and Fourier Analysis and Boundary Value Problems

Core physics courses:

PHYSICS 239-0 | Foundations of Modern Physics
PHYSICS 330-1 | Classical Mech
PHYSICS 332-0 | Statistical Mechanics
PHYSICS 333-1 | Advanced Electricity & Magnetism
PHYSICS 339-1 | Quantum Mechanics

1 lab course chosen from:

ASTRON 321-0 | Observational Astrophysics
PHYSICS 357-0 | Optics Laboratory

### Concentrations

**Advanced Physics (6 units)**

- Course | Title
- PHYSICS 330-2 | Classical Mechanics
- PHYSICS 333-2 | Advanced Electricity & Magnetism
- PHYSICS 339-2 | Quantum Mechanics

1 lab course from:

- ASTRON 321-0 | Observational Astrophysics
- PHYSICS 357-0 | Optics Laboratory
- PHYSICS 358-0 | Nanolithography
- PHYSICS 359-0 | Electronics
- PHYSICS 360-0 | Advanced Physics Laboratory

2 other 300-level physics or astronomy courses other than:

- PHYSICS 311-1 | Mathematical Tools for the Physical Sciences
- & PHYSICS 311-2 | and Mathematical Tools for the Physical Sciences
- PHYSICS 312-0 | Scalar and Vector Field Methods in Physics
- PHYSICS 335-0 | Physics of Magic
- PHYSICS 398-0 | Independent Thesis Research
- PHYSICS 399-0 | Independent Study
- ASTRON 398-0 | Honors Independent Study
- ASTRON 399-0 | Independent Study

**Astronomy (6 units)**

- Course | Title
- PHYSICS 330-2 | Classical Mechanics
- PHYSICS 333-2 | Advanced Electricity & Magnetism
- PHYSICS 339-2 | Quantum Mechanics
- ASTRON 220-0 | Introduction to Astrophysics

2 other 300-level astronomy classes other than ASTRON 398-0 or ASTRON 399-0

**Flexible (5 units)**

- Course | Title
- 3 300-level physics or astronomy lecture or lab courses
- 2 courses from the following:
  - BMD_ENG 327-0 | Magnetic Resonance Imaging
  - CHEM 307-0 | Materials and Nanochemistry
  - ELEC_ENG 360-0 | Introduction to Feedback Systems
  - ELEC_ENG 381-0 | Electronic Properties of Materials
  - ES_APPM 322-0 | Applied Dynamical Systems
  - MAT_SCI 315-0 | Phase Equilibria & Diffusion of Materials
  - MAT_SCI 331-0 | Soft Materials
  - MAT_SCI 351-0 | Introductory Physics of Materials
  - MAT_SCI 351-1 | Introductory Physics of Materials
Honors in Physics and Astronomy

Majors with strong records in their physics, astronomy, and mathematic courses and an interest in pursuing honors should notify the director of undergraduate studies in October of senior year. Eligible students must enroll for 2 units of PHYSICS 398-0 Independent Thesis Research by the time of graduation. They participate in research culminating in a written report.

Students whose research reports and grades meet department criteria are recommended to the college for graduation with honors. For more information consult the director of undergraduate studies and see Honors in the Major (https://catalogs.northwestern.edu/undergraduate/arts-sciences/#academicoptionstext).