

*University of Indianapolis – Shaheen College of Arts & Sciences*

**2025-2026 Curriculum Guide for Physics Majors (PHYS) with or without a concentration**

Bachelor of Arts or Bachelor of Science

Students who would like to major in Physics are required to complete the core courses listed below. A concentration is not required; however, students are encouraged to complete one of the physics concentrations (Traditional, Scientific Computing, Laboratory Instrumentation, or Concentration by Design) based upon their further objectives for graduate or professional school. Requirements for the concentrations are listed below.

**Physics Core Courses (56 hours):**

- **PHYS 105** Orientation to Physics (1)
- **PHYS 153** General Physics I, Calculus Based (4)
- **PHYS 163** PHYS 163 General Physics II, Calculus Based (4)
- **PHYS 230** Laboratory Instrumentation (3)
- **PHYS 250** Modern Physics (5)
- **PHYS 280** Scientific Computing I (3)
- **PHYS 360** Dynamics (3)
- **PHYS 390** Electricity and Magnetism (3)
- **PHYS 415** Physical Measurements (2)
- **PHYS 460** Quantum Mechanics (3)
- **PHYS 490** Senior Research (3)
- **CSCI 155** Intro. to Programming Using C++ (3)
- **MATH 190** Calculus and Analytic Geometry I (4)
- **MATH 191** Calculus and Analytic Geometry II (4)
- **MATH 270** Calculus and Analytic Geometry III (4)
- **MATH 280** Linear Algebra (4)
- **MATH 330** Differential Equations (3)

**Physics Concentrations:**

**Traditional Concentration (17 hours):**

- **PHYS 310** Scientific Computing II (3)
- **PHYS 330** Optics (3)
- **PHYS 420** Physical Measurements II (2)
- **MATH 350** Probability and Statistics I (3)
- **Electives (6)**1

**Scientific Computing Concentration\* (21 hours):**

- **PHYS 310** Scientific Computing II (3)
- **MATH 350** Probability and Statistics I (3)
- **CSCI 156** C/C++ Object-Oriented Programming (3)
- **CSCI 240** Data Structures and Algorithms (4)
- **CSCI XXX** Take a 300-level or higher CSCI course (4)
- **Elective (3)**

\*This concentration is one course short of a minor in Computer Science. For more information on the Computer Science minor, please consult the Math & Computer Science department information in the Academic Catalog.

## Physics Concentrations (Continued):

### Laboratory Instrumentation Concentration (17 hours):

- PHYS 310 Scientific Computing II (3)
- PHYS 400 Laboratory Instrumentation II (2)
- PHYS 420 Physical Measurements II (2)
- MATH 350 Probability and Statistics I (3)
- CSCI 156 C/C++ Object-Oriented Programming (3)
- Electives (3)

### Geophysics Concentration (14 hours):

- ESCI 150 Physical Geology (3) \*\* or
- ESCI 100 Elements of Earth-Space Science (3) and ESCI 151: Physical Geology B (1) or
- ESCI 101 Geohazards and Natural Disasters (3) and ESCI 151: Physical Geology B (1)
- ESCI 450 Physics of the Solid Earth (4)
- ESCI 455 Applied Geophysics (5)
- ESCI 4XX Upper division ESCI elective (3) (recommended ESCI 410, Hydrology)

### Concentration by Design

Students may also take advantage of the concentration by design option. Students should consult with the department before developing a proposal for the concentration by design to be certain that it has a reasonable chance of being approved by the faculty. The basic requirements are:

- **Electives (15)** Take a minimum of 15 hours of approved technical electives at the 200-level or higher.  
Minimum of one PHYS course, 300-level or higher.  
One additional elective must be 300-level or higher.

**The Physics major requires a total of 56 credit hours** (34 credits in physics, 19 credits in math and 4 credits in computer programming.)

**1:** Electives: 300-level or higher Physics, Chemistry, Biology, Computer Science or Math courses. Note: Be aware of prerequisites. A 300 or 400-level course might require the completion of an introductory sequence in that subject.

### NOTES:

- A grade of C- (1.7 on a 4.0 scale) or higher is required in all courses applying toward the Physics major.
- This degree includes a Math Minor.
- It is recommended that students take one year of general chemistry (CHEM 150 and 160).
- The Bachelor of Science Degree requires a minimum of 120 hours.
- See the General Education Core Guide for additional course requirements.
- A student may complete more than one major as long as each major has at least 24 discrete hours. Please see the Academic Catalog for additional details.

**REMEMBER:** If you have any questions about Physics Major requirements, contact a faculty advisor from the Physics & Earth-Space Sciences Department (Dr. Leah Courtland: 788-5014, courtlandl@uindy.edu, Martin Hall, Rm 265) or your academic advisor. Courses and requirements sometimes change so keep in contact with your advisor.