

**PHYSICS (PHY) 456**

311 Moulton Hall, (309) 438-8756

<https://Physics.IllinoisState.edu>Email: [info@physics.IllinoisState.edu](mailto:info@physics.IllinoisState.edu)

Chairperson: Daniel Holland

**General Department Information**

The Physics Major sequences at Illinois State University are sufficiently flexible to serve the needs of students with any of the following goals: (1) government or industrial research and development, (2) graduate study in Physics, or an allied field such as Engineering, (3) high school Physics/Science teaching, or (4) professional study in intellectual property law, patent law, or medicine.

**Physics Programs**

Degrees Offered: B.S.

**Major in Physics****Physics Sequence****Computational Physics Sequence**

Computer Physics majors should take Natural Science Alternative (NSA) General Education courses.

**Engineering Physics Dual Degree Program Sequence****Physics Teacher Education Sequence****Minor in Physics**

- 23 hours in Physics required
- Required courses:
  - PHY 110, 111, 112
  - 11 additional hours of electives from 200- or 300-level Physics courses

**Clinical Experiences in Teacher Education**

A variety of clinical (pre-student teaching) experiences, as well as student teaching, are included in the teacher candidates professional preparation. Observations, small and large group instruction, tutoring, field experiences, and student teaching are included in the Clinical Experiences Program. The experiences offered prior to student teaching are integral parts of specific college courses. Clinical experiences are provided in off-campus professional development schools, local schools and campus laboratory schools, agencies and other approved non-school settings. The Cecilia J. Lauby Teacher Education Center monitors and documents all clinical experiences. Teacher candidates will show verification of having completed clinical experiences commensurate with attaining local, state, and national standards. Teacher candidates must provide their own transportation to clinical experience sites.

Candidates are required to provide documentation of meeting all State of Illinois, district, and university requirements in regard to criminal background checks BEFORE beginning any clinical experiences. Criminal background checks must remain current as of the last day of the clinical experience. Candidates should consult with clinical course faculty and the Cecilia J. Lauby Teacher Education Center well in advance of clinical experience to determine specific requirements needed each semester.

The approximate number of clinical hours associated with each course offering can be found with the appropriate course description in this Undergraduate Catalog. The following legend relates to the type and kind of activity related to a specific course.

**Clinical Experiences Legend**

- Observation (including field trips)
- Tutoring one-on-one contact
- Non-instructional assisting
- Small group instruction
- Whole class instruction
- Work with clinic client(s)
- Graduate practicum
- Professional meeting

**Physics Courses:**

<https://coursefinder.illinoisstate.edu/directory/phy/>

**All Courses:**

<https://coursefinder.illinoisstate.edu/directory/>

**MAJOR IN PHYSICS (B.S.)****General Education (39 credit hours)**

Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses.

**Communication and Composition (2 courses required)**

- \_\_\_\_\_ 3 COM 110 Communication as Critical Inquiry  
 \_\_\_\_\_ 3 ENG 101 or ENG 101A10 Composition as Critical Inquiry

**Mathematics (1 course required)**

- \_\_\_\_\_ 4 MAT 145 Calculus I

**Natural Science/Natural Science Alternatives (2 courses required)**

Students must complete 1 course from 2 different sciences.

- \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I  
 \_\_\_\_\_ 4 CHE 140 General Chemistry I

**United States Traditions (1 course required)****Individuals & Civic Life (1 course required)****Fine Arts (1 course/3 credit hours required)\*\*\*****Humanities (1 course required)\*\*\*****Language in the Humanities (1 course required)\*\*\*****Quantitative Reasoning (1 course required)**

- \_\_\_\_\_ 4 MAT 146 Calculus II

**Science, Math, & Technology (1 course required)**

Exempt for Physics majors

**Social Sciences (1 course required)\*\*\*****Additional Graduation Requirements**

\_\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

\_\_\_\_\_ College of Arts & Sciences language requirement

**AMALI requirement**

\*\*\*certain courses in General Education fulfill the AMALI requirement  
 See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

**B.S. Science, Math, & Technology (1 course required)**

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

- \_\_\_\_\_ 4 CHE 141 General Chemistry II

**Major (71 credit hours)**

- \_\_\_\_\_ 1 PHY 107 Frontiers of Physics  
 \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I (P: MAT 145 or conc. reg.)  
 \_\_\_\_\_ 4 PHY 111 Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)  
 \_\_\_\_\_ 4 PHY 112 Physics for Science & Engineering III (P: PHY 111 and MAT 147 or conc. reg.)  
 \_\_\_\_\_ 3 PHY 217 Methods of Theoretical Physics (P: PHY 111 & MAT 147)  
 \_\_\_\_\_ 3 PHY 220 Mechanics I (P: PHY 112 and MAT 147)  
 \_\_\_\_\_ 3 PHY 240 Electricity & Magnetism I (P: PHY 217)  
 \_\_\_\_\_ 2 PHY 270 Experimental Physics (P: PHY 112 and 220)  
 \_\_\_\_\_ 3 PHY 284 Quantum Mechanics I (P: PHY 112 and MAT 175; PHY 217 or conc. reg.)  
 \_\_\_\_\_ 1 PHY 307 Seminar in Physics (P: PHY 112)  
 \_\_\_\_\_ 3 PHY 325 Thermal Physics (P: PHY 284)  
 \_\_\_\_\_ 3 PHY 340 Electricity & Magnetism II (P: PHY 240 and MAT 340)  
 \_\_\_\_\_ 1 PHY 370 Advanced Experimental Physics (P: PHY 270)  
 \_\_\_\_\_ 3 PHY 384 Quantum Mechanics II (P: PHY 284 and MAT 340)  
 \_\_\_\_\_ 4 CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)  
 \_\_\_\_\_ 4 CHE 141 General Chemistry II (P: CHE 140)  
 \_\_\_\_\_ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)  
 \_\_\_\_\_ 4 MAT 146 Calculus II (P: C or better in MAT 145)  
 \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)  
 \_\_\_\_\_ 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)  
 \_\_\_\_\_ 3 MAT 340 Differential Equations I (P: C or better in MAT 147 & 175)

**Take 6 credit hours of additional 300-level Physics electives:**

(PHY 318, 320, 330, 355, 375, 380A80, 387, 388)

**NOTE:** PHY 375 may be substituted for PHY 370

**Physics Courses:**

<https://coursefinder.illinoisstate.edu/directory/phy/>

**All Courses:**

<https://coursefinder.illinoisstate.edu/directory/>

**MAJOR IN PHYSICS (B.S.)****Transfer Students****Illinois Articulation Initiative (min. 37 credit hours)**

To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

**Communication and Composition (3 courses required)**

A grade of C or better required in ENG 101 and 145 or equivalents

- \_\_\_\_\_ 3 C2 900 COM 110 Communication as Critical Inquiry  
 \_\_\_\_\_ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry  
 \_\_\_\_\_ 3 C1 901 ENG 145 Writing in the Academic Disciplines

**Mathematics (1 course required)**

Please see major requirements for mathematics options

- \_\_\_\_\_ 4 M1 900-1 MAT 145 Calculus I (College-level Calculus I)

**Physical & Life Sciences (2 courses/7-8 hours required)**

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

- \_\_\_\_\_ 4 P1 902L CHE 140 Fundamentals of Chemistry I

**Humanities & Fine Arts (3 courses required)**

At least 1 humanities and 1 fine arts course required

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**Social & Behavioral Sciences (3 courses required)**

Two different disciplines must be represented

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**Additional Graduation Requirements**

\_\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

\_\_\_\_\_ College of Arts & Sciences language requirement

**AMALI requirement**

See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

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**B.S. Science, Math, & Technology (1 course required)**

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

- \_\_\_\_\_ 4 CHE 141 General Chemistry II

**Major (71 credit hours)**

- \_\_\_\_\_ 1 PHY 107 Frontiers of Physics  
 \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I (P: MAT 145 or conc. reg.)  
 \_\_\_\_\_ 4 PHY 111 Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)  
 \_\_\_\_\_ 4 PHY 112 Physics for Science & Engineering III (P: PHY 111 and MAT 147 or conc. reg.)  
 \_\_\_\_\_ 3 PHY 217 Methods of Theoretical Physics (P: PHY 111 & MAT 147)  
 \_\_\_\_\_ 3 PHY 220 Mechanics I (P: PHY 112 and MAT 147)  
 \_\_\_\_\_ 3 PHY 240 Electricity & Magnetism I (P: PHY 217)  
 \_\_\_\_\_ 2 PHY 270 Experimental Physics (P: PHY 112 and 220)  
 \_\_\_\_\_ 3 PHY 284 Quantum Mechanics I (P: PHY 112 and MAT 175; PHY 217 or conc. reg.)  
 \_\_\_\_\_ 1 PHY 307 Seminar in Physics (P: PHY 112)  
 \_\_\_\_\_ 3 PHY 325 Thermal Physics (P: PHY 284)  
 \_\_\_\_\_ 3 PHY 340 Electricity & Magnetism II (P: PHY 240 and MAT 340)  
 \_\_\_\_\_ 1 PHY 370 Advanced Experimental Physics (P: PHY 270)  
 \_\_\_\_\_ 3 PHY 384 Quantum Mechanics II (P: PHY 284 and MAT 340)  
 \_\_\_\_\_ 4 CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)  
 \_\_\_\_\_ 4 CHE 141 General Chemistry II (P: CHE 140)  
 \_\_\_\_\_ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)  
 \_\_\_\_\_ 4 MAT 146 Calculus II (P: C or better in MAT 145)  
 \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)  
 \_\_\_\_\_ 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)  
 \_\_\_\_\_ 3 MAT 340 Differential Equations I (P: C or better in MAT 147 & 175)

**Take 6 credit hours of additional 300-level Physics electives:**

(PHY 318, 320, 330, 355, 375, 380A80, 387, 388)

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**NOTE:** PHY 375 may be substituted for PHY 370

**Physics Courses:**

<https://coursefinder.illinoisstate.edu/directory/phy/>

**All Courses:**

<https://coursefinder.illinoisstate.edu/directory/>

## MAJOR IN PHYSICS

### COMPUTER PHYSICS SEQUENCE (B.S.)

#### General Education (39 credit hours)

Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses.

#### Communication and Composition (2 courses required)

- \_\_\_\_\_ 3 COM 110 Communication as Critical Inquiry  
 \_\_\_\_\_ 3 ENG 101 or ENG 101A10 Composition as Critical Inquiry

#### Mathematics (1 course required)

- \_\_\_\_\_ 4 MAT 145 Calculus I

#### Natural Science/Natural Science Alternatives (2 courses required)

Students must complete 1 course from 2 different sciences.

- \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I  
 \_\_\_\_\_ 4 CHE 140 General Chemistry I

#### United States Traditions (1 course required)

#### Individuals & Civic Life (1 course required)

#### Fine Arts (1 course/3 credit hours required)\*\*\*

#### Humanities (1 course required)\*\*\*

#### Language in the Humanities (1 course required)\*\*\*

#### Quantitative Reasoning (1 course required)

- \_\_\_\_\_ 4 MAT 146 Calculus II

#### Science, Math, & Technology (1 course required)

Exempt for Physics majors

#### Social Sciences (1 course required)\*\*\*

#### Additional Graduation Requirements

\_\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

\_\_\_\_\_ College of Arts & Sciences language requirement

#### AMALI requirement

\*\*\*certain courses in General Education fulfill the AMALI requirement  
 See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

#### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

- \_\_\_\_\_ 4 CHE 141 General Chemistry II

#### Major (min. 70 credit hours)

- \_\_\_\_\_ 1 PHY 107 Frontiers of Physics  
 \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I (P: MAT 145 or conc. reg.)  
 \_\_\_\_\_ 4 PHY 111 Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)  
 \_\_\_\_\_ 4 PHY 112 Physics for Science & Engineering III (P: PHY 111 and MAT 147 or conc. reg.)  
 \_\_\_\_\_ 3 PHY 217 Methods of Theoretical Physics (P: PHY 111 & MAT 147)  
 \_\_\_\_\_ 3 PHY 220 Mechanics I (P: PHY 112 and MAT 147)  
 \_\_\_\_\_ 3 PHY 240 Electricity & Magnetism I (P: PHY 217)  
 \_\_\_\_\_ 2 PHY 270 Experimental Physics (P: PHY 112 and 220)  
 \_\_\_\_\_ 3 PHY 284 Quantum Mechanics I (P: PHY 112 and MAT 175; PHY 217 or conc. reg.)  
 \_\_\_\_\_ 1 PHY 307 Seminar in Physics (P: PHY 112)  
 \_\_\_\_\_ 3 PHY 318 Methods of Computational Science (P: IT 165; CHE 140; PHY 111; CHE 360 or PHY 220 or conc. reg.)  
 \_\_\_\_\_ 3 PHY 325 Thermal Physics (P: PHY 284)  
 \_\_\_\_\_ 3 PHY 388 Advanced Computational Physics (P: PHY 220, 240, 284, and 318)  
 \_\_\_\_\_ 1-2 PHY 390 Computational Research in Physics (P: PHY 388)  
 \_\_\_\_\_ 4 IT 165 Computer Programming for Scientists (P: C or better in MAT 145)  
 \_\_\_\_\_ 3 IT 254 Hardware & Software Concepts (P: C or better in IT 168)  
 \_\_\_\_\_ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)  
 \_\_\_\_\_ 4 MAT 146 Calculus II (P: C or better in MAT 145)  
 \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)  
 \_\_\_\_\_ 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)  
 \_\_\_\_\_ 3 MAT 340 Differential Equations I (P: C or better in MAT 147 & 175)

**Take 6 credit hours of additional 300-level Computer Physics electives:**  
 (At least 1 elective must be PHY 320, 340, or 384)

#### Physics Courses:

<https://coursefinder.illinoisstate.edu/directory/phy/>

#### All Courses:

<https://coursefinder.illinoisstate.edu/directory/>

## MAJOR IN PHYSICS COMPUTER PHYSICS SEQUENCE (B.S.)

### Transfer Students

#### Illinois Articulation Initiative (min. 37 credit hours)

To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

#### Communication and Composition (3 courses required)

A grade of C or better required in ENG 101 and 145 or equivalents

- \_\_\_\_\_ 3 C2 900 COM 110 Communication as Critical Inquiry
- \_\_\_\_\_ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
- \_\_\_\_\_ 3 C1 901 ENG 145 Writing in the Academic Disciplines

#### Mathematics (1 course required)

Please see major requirements for mathematics options

- \_\_\_\_\_ 4 M1 900-1 MAT 145 Calculus I (College-level Calculus I)

#### Physical & Life Sciences (2 courses/7-8 hours required)

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

- \_\_\_\_\_ 4 P1 902L CHE 140 Fundamentals of Chemistry I

#### Humanities & Fine Arts (3 courses required)

At least 1 humanities and 1 fine arts course required

#### Social & Behavioral Sciences (3 courses required)

Two different disciplines must be represented

### Additional Graduation Requirements

\_\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

\_\_\_\_\_ College of Arts & Sciences language requirement

#### AMALI requirement

See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

#### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

- \_\_\_\_\_ 4 CHE 141 General Chemistry II

### Major (70min. credit hours)

- \_\_\_\_\_ 1 PHY 107 Frontiers of Physics
- \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I (P: MAT 145 or conc. reg.)
- \_\_\_\_\_ 4 PHY 111 Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)
- \_\_\_\_\_ 4 PHY 112 Physics for Science & Engineering III (P: PHY 111 and MAT 147 or conc. reg.)
- \_\_\_\_\_ 3 PHY 217 Methods of Theoretical Physics (P: PHY 111 & MAT 147)
- \_\_\_\_\_ 3 PHY 220 Mechanics I (P: PHY 112 and MAT 147)
- \_\_\_\_\_ 3 PHY 240 Electricity & Magnetism I (P: PHY 217)
- \_\_\_\_\_ 2 PHY 270 Experimental Physics (P: PHY 112 and 220)
- \_\_\_\_\_ 3 PHY 284 Quantum Mechanics I (P: PHY 112 and MAT 175; PHY 217 or conc. reg.)
- \_\_\_\_\_ 1 PHY 307 Seminar in Physics (P: PHY 112)
- \_\_\_\_\_ 3 PHY 318 Methods of Computational Science (P: IT 165; CHE 140; PHY 111; CHE 360 or PHY 220 or conc. reg.)
- \_\_\_\_\_ 3 PHY 325 Thermal Physics (P: PHY 284)
- \_\_\_\_\_ 3 PHY 388 Advanced Computational Physics (P: PHY 220, 240, 284, and 318)
- \_\_\_\_\_ 1-2 PHY 390 Computational Research in Physics (P: PHY 388)
- \_\_\_\_\_ 4 IT 165 Computer Programming for Scientists (P: C or better in MAT 145)
- \_\_\_\_\_ 3 IT 254 Hardware & Software Concepts (P: C or better in IT 168)
- \_\_\_\_\_ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)
- \_\_\_\_\_ 4 MAT 146 Calculus II (P: C or better in MAT 145)
- \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)
- \_\_\_\_\_ 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)
- \_\_\_\_\_ 3 MAT 340 Differential Equations I (P: C or better in MAT 147 & 175)

**Take 6 credit hours of additional 300-level Computer Physics electives:**  
(At least one elective must be PHY 320, 340, or 384)

#### Physics Courses:

<https://coursefinder.illinoisstate.edu/directory/phy/>

#### All Courses:

<https://coursefinder.illinoisstate.edu/directory/>

**MAJOR IN PHYSICS**  
**Engineering Physics Dual Degree Program**  
**Sequence (B.S.)**

**Illinois Articulation Initiative (min. 37 credit hours)**

To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

**Communication and Composition (3 courses required)**

A grade of C or better required in ENG 101 and 145 or equivalents

- \_\_\_\_\_ 3 C2 900 COM 110 Communication as Critical Inquiry
- \_\_\_\_\_ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
- \_\_\_\_\_ 3 C1 901 ENG 145 Writing in the Academic Disciplines

**Mathematics (1 course required)**

Please see major requirements for mathematics options

- \_\_\_\_\_ 4 M1 900-1 MAT 145 Calculus I (College-level Calculus I)

**Physical & Life Sciences (2 courses/7-8 hours required)**

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

- \_\_\_\_\_ 4 P1 902L CHE 140 General Chemistry I

**Humanities & Fine Arts (3 courses required)**

At least 1 humanities and 1 fine arts course required

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**Social & Behavioral Sciences (3 courses required)**

Two different disciplines must be represented

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**Additional Graduation Requirements**

\_\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

\_\_\_\_\_ College of Arts & Sciences language requirement

**AMALI requirement**

See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

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**B.S. Science, Math, & Technology (1 course required)**

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

- \_\_\_\_\_ 4 CHE 141 General Chemistry II

**Major (69 credit hours)**

- \_\_\_\_\_ 1 PHY 107 Frontiers of Physics
- \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I (P: MAT 145 or conc. reg.)
- \_\_\_\_\_ 4 PHY 111 Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)
- \_\_\_\_\_ 4 PHY 112 Physics for Science & Engineering III (P: PHY 111 and MAT 147 or conc. reg.)
- \_\_\_\_\_ 3 PHY 217 Methods of Theoretical Physics (P: PHY 111 & MAT 147)
- \_\_\_\_\_ 3 PHY 220 Mechanics I (P: PHY 112 and MAT 147)
- \_\_\_\_\_ 3 PHY 240 Electricity & Magnetism I (P: PHY 217)
- \_\_\_\_\_ 2 PHY 270 Experimental Physics (P: PHY 112 and 220)
- \_\_\_\_\_ 3 PHY 284 Quantum Mechanics I (P: PHY 112 and MAT 175; PHY 217 or conc. reg.)
- \_\_\_\_\_ 1 PHY 307 Seminar in Physics (P: PHY 112)
- \_\_\_\_\_ 4 CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)
- \_\_\_\_\_ 4 CHE 141 General Chemistry II (P: CHE 140)
- \_\_\_\_\_ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)
- \_\_\_\_\_ 4 MAT 146 Calculus II (P: C or better in MAT 145)
- \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)
- \_\_\_\_\_ 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)

**Take 17 credit hours of additional approved upper division courses transferred from the chosen engineering university:**

Please consult with your academic advisor

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**Physics Courses:**

<https://coursefinder.illinoisstate.edu/directory/phy/>

**All Courses:**

<https://coursefinder.illinoisstate.edu/directory/>

**MAJOR IN PHYSICS**  
**Engineering Physics Dual Degree Program**  
**Sequence (B.S.)**

**Transfer Students**

**Illinois Articulation Initiative (min. 37 credit hours)**

To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

**Communication and Composition (3 courses required)**

A grade of C or better required in ENG 101 and 145 or equivalents

- \_\_\_\_\_ 3 C2 900 COM 110 Communication as Critical Inquiry
- \_\_\_\_\_ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
- \_\_\_\_\_ 3 C1 901 ENG 145 Writing in the Academic Disciplines

**Mathematics (1 course required)**

Please see major requirements for mathematics options

- \_\_\_\_\_ 4 M1 900-1 MAT 145 Calculus I (College-level Calculus I)

**Physical & Life Sciences (2 courses/7-8 hours required)**

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

- \_\_\_\_\_ 4 P1 902L CHE 140 General Chemistry I

**Humanities & Fine Arts (3 courses required)**

At least 1 humanities and 1 fine arts course required

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**Social & Behavioral Sciences (3 courses required)**

Two different disciplines must be represented

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**Additional Graduation Requirements**

\_\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

\_\_\_\_\_ College of Arts & Sciences language requirement

**AMALI requirement**

See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

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**B.S. Science, Math, & Technology (1 course required)**

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

- \_\_\_\_\_ 4 CHE 141 General Chemistry II

**Major (69 credit hours)**

- \_\_\_\_\_ 1 PHY 107 Frontiers of Physics
- \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I (P: MAT 145 or conc. reg.)
- \_\_\_\_\_ 4 PHY 111 Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)
- \_\_\_\_\_ 4 PHY 112 Physics for Science & Engineering III (P: PHY 111 and MAT 147 or conc. reg.)
- \_\_\_\_\_ 3 PHY 217 Methods of Theoretical Physics (P: PHY 111 & MAT 147)
- \_\_\_\_\_ 3 PHY 220 Mechanics I (P: PHY 112 and MAT 147)
- \_\_\_\_\_ 3 PHY 240 Electricity & Magnetism I (P: PHY 217)
- \_\_\_\_\_ 2 PHY 270 Experimental Physics (P: PHY 112 and 220)
- \_\_\_\_\_ 3 PHY 284 Quantum Mechanics I (P: PHY 112 and MAT 175; PHY 217 or conc. reg.)
- \_\_\_\_\_ 1 PHY 307 Seminar in Physics (P: PHY 112)
- \_\_\_\_\_ 4 CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)
- \_\_\_\_\_ 4 CHE 141 General Chemistry II (P: CHE 140)
- \_\_\_\_\_ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)
- \_\_\_\_\_ 4 MAT 146 Calculus II (P: C or better in MAT 145)
- \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)
- \_\_\_\_\_ 4 MAT 175 Elementary Linear Algebra (P: C or better in MAT 146)

**Take 17 credit hours of additional approved upper division courses transferred from the chosen engineering university:**

Please consult with your academic advisor

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**Physics Courses:**

<https://coursefinder.illinoisstate.edu/directory/phy/>

**All Courses:**

<https://coursefinder.illinoisstate.edu/directory/>

## MAJOR IN PHYSICS

### PHYSICS TEACHER EDUCATION SEQUENCE (B.S.)

#### General Education (39 credit hours)

Refer to the General Education section of the Undergraduate Catalog for a complete list of General Education requirements and courses.

#### Communication and Composition (2 courses required)

- \_\_\_\_\_ 3 COM 110 Communication as Critical Inquiry
- \_\_\_\_\_ 3 ENG 101 or ENG 101A10 Composition as Critical Inquiry

#### Mathematics (1 course required)

- \_\_\_\_\_ 4 MAT 145 Calculus I

#### Natural Science/Natural Science Alternatives (2 courses required)

Students must complete 1 course from 2 different sciences.

- \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I
- \_\_\_\_\_ 4 CHE 140 General Chemistry I

#### United States Traditions (1 course required)

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#### Individuals & Civic Life (1 course required)

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#### Fine Arts (1 course/3 credit hours required)\*\*\*

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#### Humanities (1 course required)\*\*\*

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#### Language in the Humanities (1 course required)\*\*\*

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#### Quantitative Reasoning (1 course required)

- \_\_\_\_\_ 4 MAT 146 Calculus II

#### Science, Math, & Technology (1 course required)

Exempt for Physics majors

#### Social Sciences (1 course required)\*\*\*

- \_\_\_\_\_ 3 PSY 110 Fundamentals of Psychology

#### Additional Graduation Requirements

\_\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

\_\_\_\_\_ College of Arts & Sciences language requirement

#### AMALI requirement

\*\*\*certain courses in General Education fulfill the AMALI requirement  
See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

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#### B.S. Science, Math, & Technology (1 course required)

See the B.S.—SMT Requirement section of the catalog or the Course Finder website for a list of courses.

- \_\_\_\_\_ 4 CHE 141 General Chemistry II

#### Major (87 credit hours)

##### PHY requirements (38 credit hours)

- \_\_\_\_\_ 1 PHY 107 Frontiers of Physics
- \_\_\_\_\_ 4 PHY 110 Physics for Science & Engineering I (P: MAT 145 or conc. reg.)
- \_\_\_\_\_ 4 PHY 111 Physics for Science & Engineering II (P: PHY 110 and MAT 146 or conc. reg.)
- \_\_\_\_\_ 4 PHY 112 Physics for Science & Engineering III (P: PHY 111 and MAT 147 or conc. reg.)
- \_\_\_\_\_ 3 PHY 205 Origin of the Universe (P: MAT 145 and PHY 110)
- \_\_\_\_\_ 1 PHY 209 Introduction to Teaching High School Physics (P: 8+ earned hours in Physics)
- \_\_\_\_\_ 3 PHY 217 Methods of Theoretical Physics (P: PHY 111 & MAT 147)
- \_\_\_\_\_ 3 PHY 220 Mechanics I (P: PHY 112 and MAT 147)
- \_\_\_\_\_ 1 PHY 302 Computer Applications in High School Physics (P: PHY 209 or conc. reg.)
- \_\_\_\_\_ 1 PHY 307 Seminar in Physics (P: PHY 112)
- \_\_\_\_\_ 3 PHY 310 Reading for Teaching High School Physics (P: 12+ earned hours in Physics)
- \_\_\_\_\_ 3 PHY 311 Teaching High School Physics (P: 18 hours in Physics; PHY 310; C or better in TCH 216 or conc. reg.)
- \_\_\_\_\_ 3 PHY 312 Physics Teaching From the Historical Perspective‡ (P: 20+ earned hours in Physics)
- \_\_\_\_\_ 1 PHY 353 Student Teaching Seminar (P: Departmental consent)

##### Take one of the following courses:

- \_\_\_\_\_ 3 PHY 240 Electricity & Magnetism I (P: PHY 217)
- \_\_\_\_\_ 3 PHY 284 Quantum Mechanics I (P: PHY 112 and MAT 175; PHY 217 or conc. reg.)

##### Requirements outside of PHY (27 credit hours)

- \_\_\_\_\_ 3 BSC 101 Fundamental Concepts in Biology
- \_\_\_\_\_ 4 CHE 140 General Chemistry I (P: C or better in MAT 119; or C or better in MAT 120 or 144 or 145 or conc. reg.)
- \_\_\_\_\_ 4 CHE 141 General Chemistry II (P: CHE 140)
- \_\_\_\_\_ 4 GEO 100 Introduction to Environmental Systems
- \_\_\_\_\_ 4 MAT 145 Calculus I (P: C or better in MAT 144 or placement)
- \_\_\_\_\_ 4 MAT 146 Calculus II (P: C or better in MAT 145)
- \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)

##### Professional education requirements (22 credit hours):

- \_\_\_\_\_ 3 PSY 215 Educational Psychology (P: PSY 110 or 111)
- \_\_\_\_\_ 2 TCH 212 The Teaching Profession in Secondary Schools (P: 45+ earned hours; 2.5 major & cum. GPA; ENG 101, COM 110)
- \_\_\_\_\_ 3 TCH 216 Principles & Practices for Teaching & Learning in Secondary Schools (P: TCH 212; 2.5 major & cum. GPA)
- \_\_\_\_\_ 3 TCH 219 Integrating Multiple Literacies & Technology Across the Secondary Curriculum (P: TCH 212, 216; 2.5 major & cum. GPA)
- \_\_\_\_\_ 8 STT 399A72 Student Teaching in Physics

##### Take one of the following courses (P: 45+ earned hours):

- \_\_\_\_\_ 3 EAF 228 Social Foundations
- \_\_\_\_\_ 3 EAF 231 Introduction to Philosophy of Education
- \_\_\_\_\_ 3 EAF 235 Historical Foundations

##### Physics Courses:

<https://coursefinder.illinoisstate.edu/directory/phy/>

##### All Courses:

<https://coursefinder.illinoisstate.edu/directory/>



## MAJOR IN PHYSICS PHYSICS TEACHER EDUCATION SEQUENCE (B.S.)

### Transfer Students

#### Illinois Articulation Initiative (min. 37 credit hours)

To be eligible for IAI, at least one transfer course must have been articulated to an IAI core requirement. Refer to the Undergraduate Catalog for a complete list of IAI courses and policies.

#### Communication and Composition (3 courses required)

A grade of C or better required in ENG 101 and 145 or equivalents

- \_\_\_\_\_ 3 C2 900 COM 110 Communication as Critical Inquiry
- \_\_\_\_\_ 3 C1 900 ENG 101 or ENG 101A10 Composition as Critical Inquiry
- \_\_\_\_\_ 3 C1 901 ENG 145 Writing in the Academic Disciplines

#### Mathematics (1 course required)

Please see major requirements for mathematics options

- \_\_\_\_\_ 4 M1 900-1 MAT 145 Calculus I (College-level Calculus I)

#### Physical & Life Sciences (2 courses/7-8 hours required)

Students must complete 1 life science and 1 physical science course; at least 1 course must have a lab.

- \_\_\_\_\_ 4 P1 902L CHE 140 General Chemistry I
- \_\_\_\_\_ 3 L1 9000L BSC 101 Fundamental Concepts in Biology

#### Humanities & Fine Arts (3 courses required)

At least 1 humanities and 1 fine arts course required

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#### Social & Behavioral Sciences (3 courses required)

Two different disciplines must be represented

- \_\_\_\_\_ 3 S6 900 PSY 110 Fundamentals of Psychology

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### Additional Graduation Requirements

\_\_\_\_\_/120 minimum total credit hours

\_\_\_\_\_/42 minimum senior college hours

\_\_\_\_\_ College of Arts & Sciences language requirement

#### AMALI requirement

See the AMALI Requirement section of the catalog or the Course Finder website for a list of courses.

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- \_\_\_\_\_ 4 MAT 147 Calculus III (P: C or better in MAT 146)

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- \_\_\_\_\_ 3 EAF 235 Historical Foundations

#### Physics Courses:

<https://coursefinder.illinoisstate.edu/directory/phy/>

#### All Courses:

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