

PHYSICS (BS)

The Department of Physics offers courses and concentrations designed to teach students about the fundamental processes that govern our universe. Students interested in majoring in physics can choose from several concentrations.

The **Standard Physics** concentration provides a curriculum that highlights the core areas of theoretical and experimental physics. The **Computational Physics** concentration gives a curriculum that emphasizes the use of computer simulations as a tool to visualize and understand natural phenomena. For students who wish to apply a physics degree to a career outside of physics, the department offers a concentration entitled **Interdisciplinary Physics**. This concentration combines a major in physics with a minor in a second field of the student's choice with their advisor's consent.

In each concentration, student participation in faculty research is an important component of the program at all levels. This experience prepares students for independent work in industry or graduate study in physics or in applied sciences such as optics, photonics, scientific computing, engineering, or computer science. Participation in research can be pursued either through independent study during the academic year or full-time during the summer quarter.

For students interested in engineering, the department offers a concentration in **Engineering Physics**. Through a joint program with Illinois Institute of Technology (IIT), students can complete a five-year dual-degree program while remaining full-time DePaul students. This five-year program enables students to earn a BS degree in Physics from DePaul and a BS in Engineering from IIT in Mechanical, Aerospace, Electrical/Computer Engineering. Students interested in obtaining a BS in Physics with the Engineering Physics concentration must be accepted into one of these programs at IIT as part of the DePaul-IIT Joint Engineering Program.

Additionally, students interested in engineering, but are not interested in the joint dual-degree program, will have the scientific basis to complete an engineering program at another institution after the first two years of the physics major curriculum at DePaul.

| Program Requirements | Quarter Hours |
|----------------------------------|---------------|
| Liberal Studies Requirements | 76 |
| Major Requirements | 40 |
| Major Concentration Requirements | 48-56 |
| Open Electives | 20-28 |
| Total hours required | 192 |

Learning Outcomes

Students will be able to:

- Demonstrate critical thinking, quantitative, and mathematical skills required to answer questions about the behavior of the universe.
- Create and interpret multiple representations of physics concepts through the use of mathematics, computational code, computer simulations, as well as written, graphical, and pictorial descriptions.
- Design, execute, and analyze experiments to test physics theories and hypotheses.
- Effectively communicate their understanding of physics concepts to scientists and non-scientists.

College Core Requirements

Modern Language Requirements

Students who intend to graduate with the Bachelor of Arts (BA) degree will be required to demonstrate competence in a modern language equivalent to the proficiency attained from one year of college-level language study. Such competence may be demonstrated in one of several ways:

- completing the last course in the fourth-year high school sequence of any language
- completing the last course in the first-year college sequence of any language
- completing a college course beyond the first-year level in any language
- achieving a satisfactory score on any of the Modern Language placement examinations administered at DePaul
- achieving a satisfactory rating in a proficiency examination accepted by DePaul
- achieving a score of 3 or higher on the Advance Placement (AP) test for any language
- achieving a score of 5 or higher in the Language B assessment from a Standard or Higher Level International Baccalaureate (IB) program
- achieving a satisfactory score on the CLEP examination

Please note: Modern Languages courses with an E-designation are taught in English and may not be applied to the Modern Language Requirement.

For further information regarding satisfactory scores and possible credit from the DePaul placement, AP, CLEP, or IB examinations, please contact Student Records.

Students who complete an Inter-College Transfer (ICT) to the College of Science and Health will abide by the College of Science and Health Modern Language Requirement in place on the effective date of the ICT.

BA students who meet College requirements and wish to pursue further work in the language may elect the Language for Liberal Studies Option (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-program-guidelines/language-for-liberal-studies-option/>) of the Liberal Studies Program. While Bachelor of Science (BS) students are not required to demonstrate competency in a modern language, the Language for Liberal Studies Option is available to them for language study at any level. Modern Languages courses with an E-designation are taught in English and may not be applied to the Language for Liberal Studies Option.

Major Declaration Requirements

All students in the College are required to declare a major field prior to beginning their junior year. After researching College programs, the student should declare a major field by visiting Campus Connection and using the Declarations and Inter-College Transfer tool. The student will then be assigned a faculty advisor or staff advisor in the department or program and should make an appointment to see that advisor at his or her earliest convenience.

To change major fields, or to declare a minor or concentration, the student must use the Declarations and Inter-College Transfer tool described above. However, for the purpose of exploring the possibility of changing a major field, the student should consult an academic advisor

in the College or an academic advisor in the Office for Academic Advising Support.

Liberal Studies Requirements

Honors program requirements can be found in the individual Colleges & Schools section of the University Catalog. Select the appropriate college or school, followed by Undergraduate Academics and scroll down.

| First Year Program | | Hours |
|------------------------------------|---|-------|
| Chicago Quarter | | |
| LSP 110 | DISCOVER CHICAGO | 4 |
| or LSP 111 | or EXPLORE CHICAGO | |
| Focal Point | | |
| LSP 112 | FOCAL POINT SEMINAR | 4 |
| Writing | | |
| WRD 103 | COMPOSITION AND RHETORIC I ¹ | 4 |
| WRD 104 | COMPOSITION AND RHETORIC II ¹ | 4 |
| Quantitative Reasoning | | |
| Not Required | | |
| Sophomore Year | | |
| Race, Power, and Resistance | | |
| LSP 200 | SEMINAR ON RACE, POWER, AND RESISTANCE | 4 |
| Junior Year | | |
| Experiential Learning | | |
| Required | | 4 |
| Senior Year | | |
| Capstone | | |
| PHY 330 | SENIOR CAPSTONE PHYSICAL SCIENCE ^{1,2} | 4 |

¹ Students must earn a C- or better in this course.

² Students with a primary major in Physics are required to complete the Capstone offered by the Physics department. Students double majoring or pursuing dual degrees with the primary major or primary degree in Physics are required to complete the Capstone offered by the Physics department. Physics students in the University Honors Program shall take the University Honors Capstone. They are not expected to take both the Honors Capstone and the primary major or primary degree Capstone.

Learning Domains

Arts and Literature (AL) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/arts-and-literature/>)

- 3 Courses Required

Historical Inquiry (HI) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/historical-inquiry/>)

- 2 Courses Required

Math and Computing (MC) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/math-and-computing/>)

- Not Required

Philosophical Inquiry (PI) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/philosophical-inquiry/>)

- 2 Courses Required

Religious Dimensions (RD) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/religious-dimensions/>)

- 2 Courses Required

Scientific Inquiry (SI) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/scientific-inquiry/>)

- Not Required

Social, Cultural, and Behavioral Inquiry (SCBI) (<https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/social-cultural-and-behavioral-inquiry/>)

- 3 Courses Required

Notes

Courses offered in the student's primary major cannot be taken to fulfill LSP Domain requirements. If students double major, LSP Domain courses may double count for both LSP credit and the second major. Students who choose to take an experiential learning course offered by the major may count it either as a general elective or the Experiential Learning requirement.

In meeting learning domain requirements, no more than one course that is outside the student's major and is cross-listed with a course within the student's major, can be applied to count for LSP domain credit. This policy does not apply to those who are pursuing a double major or earning BFA or BM degrees.

Major Requirements

Course Requirements

Common Core

Physics

| Course | Title | Quarter Hours |
|---------|---|---------------|
| PHY 170 | UNIVERSITY PHYSICS I | 4 |
| PHY 171 | UNIVERSITY PHYSICS II | 4 |
| PHY 172 | UNIVERSITY PHYSICS III | 4 |
| PHY 270 | UNIVERSITY PHYSICS IV | 4 |
| PHY 300 | METHODS OF COMPUTATIONAL AND THEORETICAL PHYSICS I | 4 |
| PHY 301 | METHODS OF COMPUTATIONAL AND THEORETICAL PHYSICS II | 4 |
| PHY 330 | SENIOR CAPSTONE PHYSICAL SCIENCE (Liberal Studies Program Capstone) | 4 |

Mathematics

| Course | Title | Quarter Hours |
|---|--------------|---------------|
| Select one of the following Calculus sequences: | | 12-18 |
| Sequence One | | |
| MAT 150 | CALCULUS I | |
| MAT 151 | CALCULUS II | |
| MAT 152 | CALCULUS III | |

Sequence Two

| | |
|---------|---|
| MAT 147 | CALCULUS WITH INTEGRATED PRECALCULUS I |
| MAT 148 | CALCULUS WITH INTEGRATED PRECALCULUS II |
| MAT 149 | CALCULUS WITH INTEGRATED PRECALCULUS III |

Sequence Three

| | |
|---------|--------------------------|
| MAT 155 | SUMMER CALCULUS I |
| MAT 156 | SUMMER CALCULUS II |
| MAT 260 | MULTIVARIABLE CALCULUS I |

4

Sequencing of Coursework

Students interested in majoring in physics, applied computational physics, or pre-engineering should enroll in PHY 170 and MAT 150 in the autumn quarter of their first year, provided they are adequately prepared in mathematics.

The sequences of PHY 170, PHY 171, and PHY 172 and MAT 150, MAT 151, and MAT 152 are prerequisites to PHY 270, PHY 300 and PHY 301, and PHY 370, which should be taken in the sophomore year together with MAT 260 and MAT 261.

It is recommended that students interested in the standard concentration or pre-engineering also take the chemistry sequence (CHE 130, or CHE 120 and CHE 131 and CHE 132 or CHE 122 and CHE 133, CHE 134 and CHE 135) their first year. Because of the predominance of physics, mathematics, and chemistry sequences in the freshman and sophomore years, it is crucial that Physics and Pre-Engineering majors be advised by Physics faculty upon enrollment at DePaul.

Concentration Requirements

Students must also complete the requirements from one of the following concentrations: Standard, Computational, Engineering, or Interdisciplinary Physics. Students are limited to declaring only one concentration.

Students are advised to talk with their advisor before double majoring, because some major combinations are prohibited. No more than 50% of the credits that apply to one major may be drawn from another major.

Concentrations, tracks and specializations provide focus to the major. In addition to any college core requirements, liberal studies requirements and major requirements, students are required to choose one of the following:

- Engineering Physics Concentration, Physics (BS) (<https://catalog.depaul.edu/programs/physics-bs/engineering-physics-concentration-physics-bs/>)
- Interdisciplinary Physics Concentration, Physics (BS) (<https://catalog.depaul.edu/programs/physics-bs/interdisciplinary-physics-concentration-physics-bs/>)
- Standard Concentration, Physics (BS) (<https://catalog.depaul.edu/programs/physics-bs/standard-concentration-physics-bs/>)