PHYSICS, BS

Directors of Undergraduate Studies

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Faculty

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Physicists idealize the behavior of matter and energy in terms of mathematical representations called the "fundamental laws of nature" and seek to explain the properties of nuclei, atoms, molecules, and systems of these particles (gases, liquids, crystals, etc.). Undergraduate physics courses provide a background in problem solving in many areas of physical science using theoretical, computational, and laboratory techniques.

The department offers coursework leading to either a B.A. or a B.S. degree. The B.A. degree program is an excellent liberal arts major that requires fewer credit hours in the major than the B.S. program. The B.S. degree is the recommended choice for students contemplating employment requiring advanced technical skills, or for those considering graduate work in science, engineering, or medicine.

Other information about physics can be found at physics.syr.edu.

Student Learning Outcomes

1. A student will be able to explain phenomena occurring from sub-atomic to cosmological distance scales using qualitative physical principles.
2. A student will be able to apply mathematics and logic to solve problems associated with natural phenomena.
3. A student will be able to explain the experimental underpinnings of physical laws.
4. A student will be able to employ basic laboratory and technical skills to solve physics problems as a result of formal laboratory course work and research opportunities with faculty.
5. A student will be able to utilize modelling software and numerical methods to solve complex problems.

B.S. Degree Requirements

The B.S. degree in physics requires at least 38 credits of physics coursework, including at least 30 credits of upper-division physics courses (numbered 300 or above). The required course work for the B.S. includes:

Code	Title	Credits
Required PHY Courses		
PHY 215 & PHY 225	General Physics I for Scientists and Experiencing Physics I	5
PHY 216 & PHY 226	General Physics II for Scientists and Experiencing Physics II	5
PHY 302	Mathematical Skills for Physicists	3
PHY 344		4
PHY 360	Vibrations, Waves and Thermal Physics	3
PHY 361	Statistical Physics and Quantum Phenomena	3
PHY 365	Experiencing Physics III	2
PHY 366	Experiencing Physics IV	2
PHY 523	Advanced Mechanics	3
PHY 524	Electromagnetics I	3
PHY 531	Thermodynamics and Statistical Mechanics	3
PHY 567	Introduction to Quantum Mechanics I	3
Note: Students declaring a Physics B.S. after having successfully completed PHY 211, PHY 221, PHY 212, and PHY 222 are not required to take PHY 215, PHY 225, PHY 216, and PHY 226 but will need to earn at least 2 additional credits in any PHY or AST courses with the approval of the Physics Director of Undergraduate Studies.		
Mathematics		
MAT 295	Calculus I	4
MAT 296	Calculus II	2-4
MAT 397	Calculus III	4
Upper-division PHY electives		
The B.S. degree requires at least 1 additional credit hour of upper-division coursework beyond the required core of physics coursework. There are typically several courses offered each year in addition to the possibility of receiving credit for research, theses, or the seminar in physics education. Students considering graduate work in physics are strongly encouraged to take PHY 525 (Electromagnetics II) and PHY 568 (Quantum Mechanics II).		1
Students are also encouraged to take an introductory lecture and lab course from another scientific discipline, including chemistry, biology, or earth science.		
Total Credits		**50-52**

B.S with Distinction

A B.S. with distinction is awarded to students who complete the B.S. program with 36 credit hours or more of upper-division physics courses and who achieve at least a 3.4 grade point average in their physics coursework. A B.S. with distinction is noted on a student's official transcript.

College of Arts and Sciences Requirements
For all Arts and Sciences|Maxwell students, successful completion of a bachelor's degree in this major requires a minimum of 120 credits, 96 of which must be Arts and Sciences|Maxwell credits, completion of the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text) requirements, and the requirements for this major (30 credits) that are listed above.

Dual Enrollments:
Students dually enrolled in **Newhouse*** and Arts and Sciences|Maxwell will complete a minimum of 122 credits, with at least 90 credits in Arts and Sciences|Maxwell coursework and an Arts and Sciences|Maxwell major.

*Students dually enrolled in the College of Arts and Sciences|Maxwell as first year students must complete the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text).

Students who transfer to the dual program after their first year as singly enrolled students in the Newhouse School will satisfy general requirements for the dual degree program by completing the Newhouse Core Requirements.

Undergraduate University Requirements
The following requirements and experiences apply to all Syracuse University Undergraduate matriculated degree programs.

- IDEA Course Requirement (https://coursecatalog.syracuse.edu/undergraduate/idea-course-requirement/)
- First Year Seminar (https://coursecatalog.syracuse.edu/undergraduate/courses/fys/)