

Physics Major (BS)

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About

Physics is the human endeavor to understand the nature of matter, energy, and their governing interactions from the scale of subatomic particles to that of the cosmos. Through the interplay of theoretical effort and experimentation, physics strives to discover the mathematical laws of nature. As such, it both forms a foundation for a liberal arts education and provides a framework to address key challenges in our ever-changing technical world.

The Department of Physics at Villanova University is a nurturing, supportive, and inclusive academic community that strives to reflect the values of the University. We undertake our mission to educate undergraduate students in a broad range of experimental, theoretical, and computational methods through classroom and laboratory experiences. Our students address fundamental questions of nature through meaningful participation in faculty-led research that connects them with physicists around the world. The critical thinking and problem-solving skills learned by our students enable them to engage the diverse world beyond Villanova, whether they continue in the field of physics or choose to apply their educational experience to the challenges of another field.

Program: [Physics](#)

Type: Bachelor of Science

PRIMARY MAJOR (123 credits)

Required Major Courses (B.S.) (69 credits)

The BS program consists of a rigorous and focused curriculum that provides a deep background in fundamental physics. The BS is excellent preparation for the student who aspires to graduate studies in Physics, but also provides comprehensive training in problem solving and critical thinking that are applicable to a wide range of career paths.

Course	Title	Credits
PHY 2420	Matter and Interactions I	3
PHY 2421	Lab: Matter and Interactions I	1
PHY 2422	Matter and Interactions II	3
PHY 2423	Lab:Matter and Interactions II	1
PHY 2601	Computational Phy Lab I	2
PHY 2603	Computational Phy Lab II	2
MAT 1500	Calculus I	4
MAT 1505	Calculus II	4
MAT 2500	Calculus III	4
MAT 2705	Diff Equation with Linear Alg	4
PHY 3200	Thermo, Optics and Waves	3
PHY 3400	Modern Physics	3
PHY 3310	Electronics	3
PHY 3311	Electronics Lab	1
PHY 4000	Elec & Magnetism I	3
PHY 4100	Mechanics I	3
PHY 4200	Mathematical Physics I	3
PHY 4801	Experimental Physics I	2
PHY 4803	Experimental Physics II	2
PHY 5100	Quantum Mechanics	3
PHY 5200	Thermo/Statistical Mech	3
PHY 5800	Advanced Mechanics	3
PHY 4301	Experimental Methods I	2
	PHY Electives for B.S.	6

Core Curriculum Requirements (33 credits)

Physics BS Majors meet the following core requirements in the major and therefore are omitted from the summary below:

- Core Math (3 cr)
- Natural Science (8 cr)

Course	Title	Credits
ACS 1000	Ancients	3
ACS 1001	Moderns	3
THL 1000	Faith, Reason, and Culture	3
PHI 1000	Knowledge, Reality, Self	3
ETH 2050	The Good Life:Eth & Cont Prob	3
	Literature and Writing Seminar (1 course)	3
	History (1 course)	3
	Social Sciences (2 courses)	6
	Fine Arts (1 course)	3
	Upper-Level Theology (1 course)	3
	Language Requirement	
	Diversity Requirement (2 courses)	

Free Elective Requirement (21 credits)

Students with a Physics BS primary major have twenty-one (21) required free elective credits.

Degree Credit Summary

- **Major Credits:** 69 credits
- **Core Credits:** 33 credits
- **Free Electives Credits:** 21 credits
- **Total Required Credits:** 123 Credits

Note: The above credit totals are based on the minimum number of required credits in each degree area. The minimum number of required credits in each area listed above must be met. Credits taken beyond the required minimum for one area may not be applied to another area.

SECONDARY MAJOR

Students who declare Physics BS as a **secondary major** must complete the Required Major Courses to achieve this major. Students are able to count any eligible course taken in their primary major, the core curriculum, minors, concentrations, or free electives toward these requirements.

Category Descriptions

PHY Electives for B.S.

Credits: 6

Select 2 Classes in PHY 3000:6700 for a total of 6 credits.