

PHYSICS MAJOR

Department of Physics (<https://catalog.washcoll.edu/catalog/departments-programs/physics/>)
Division of Natural Sciences and Mathematics

The Physics Department prepares its majors for any career where problem-solving skills are required. Popular post-graduation options include graduate study in physics or engineering, industrial research, secondary school teaching, and professional careers in engineering, medicine, information technology, cybersecurity, data analytics, and business/finance.

Physics Major Requirements

Code	Title	Credits	Notes
Required Introductory Courses		16	
PHY 111	General Physics I with Lab		
PHY 112	General Physics II with Lab		
PHY 211	Modern Physics with Lab		
PHY 252	Scientific Modeling & Data Analysis		
Select 3 Theory Courses From Below ¹		12	
PHY 321	Classical Mechanics		
PHY 322	Quantum Mechanics		
PHY 323	Thermodynamics & Statistical Mechanics		
PHY 324	Electricity and Magnetism		
Experimental Physics Courses		8	
PHY 352 or PHY 354	Electronics with Lab Optics with Lab		
PHY 451	Advanced Physics Laboratory		
Mathematics Courses ²		16	
MAT 111 or MAT 106 & MAT 107	Differential Calculus Stretch Differential Calculus I and Stretch Differential Calculus II		
MAT 112	Integral Calculus		
MAT 210	Multivariable Calculus		
MAT 310	Differential Equations		
One additional physics course at the 300+ level is required. ³		4	
300-level PHY			
Departmental Seminar Courses ⁴		5	
PHY 292	Sophomore Physics Seminar		
PHY 391	Junior Physics Seminar I		
PHY 392	Junior Physics Seminar II		
PHY 491	Senior Physics Seminar I		
PHY 492	Senior Physics Seminar II		
Senior Capstone		2-4	
PHY SCE	Senior Capstone Experience		
Total Credits		63-65	

¹ Students planning to attend graduate school in physics or engineering should plan to take all four upper-level theory courses.

² Students planning to attend graduate school in physics or engineering are also recommended to take MAT 280 Linear Algebra and MAT 340 Numerical Analysis.

³ Another upper-level science/math course approved by the physics department may occasionally be substituted for this requirement.

⁴ Each seminar course is one credit hour. The seminar meets one afternoon each week. Students begin the seminar sequence during the spring semester of the sophomore year.

Students planning to major in physics should ideally take PHY 111 General Physics I with Lab, PHY 112 General Physics II with Lab, MAT 111 Differential Calculus and MAT 112 Integral Calculus in their freshman year. However, it is possible to complete the major if students start major

coursework during their sophomore year. A score of four or better on an Advanced Placement examination may, with the approval of the appropriate academic department, earn course credit toward graduation and make the student eligible to take upper-level courses in the department. Physics majors intending to become certified high school teachers should inform the Education Department as early in their college careers as possible to assure proper scheduling.

Alternate Requirements for the Bachelor of Science in Physics for Dual Degree Engineering Students (3:2 or 3:3 plans only)

Code	Title	Credits	Notes
All of the following introductory courses are required: ⁵		16	
PHY 111	General Physics I with Lab		
PHY 112	General Physics II with Lab		
PHY 211	Modern Physics with Lab		
PHY 252	Scientific Modeling & Data Analysis		
Two upper-level theory courses are required, selected from the following:		8	
PHY 321	Classical Mechanics		
PHY 322	Quantum Mechanics		
PHY 323	Thermodynamics & Statistical Mechanics		
PHY 324	Electricity and Magnetism		
One course in Electronics		4	
PHY 352	Electronics with Lab		
All of the following courses in mathematics are required		16	
MAT 111	Differential Calculus		
MAT 112	Integral Calculus		
MAT 210	Multivariable Calculus		
MAT 310	Differential Equations		
Three semesters of the departmental seminar course are required. Each seminar course is one credit hour. The seminar meets one afternoon each week.		3	
PHY 292	Sophomore Physics Seminar		
PHY 391	Junior Physics Seminar I		
PHY 392	Junior Physics Seminar II		
Total Credits		47	

⁵ Additional courses required by the Engineering partner institution as outlined on the Pre-Engineering section of the catalog (<https://catalog.washcoll.edu/catalog/professional-programs/pre-engineering/#requirementstext>)

First Year			
Fall	Credits	Spring	Credits
FYS 101		4 MAT 112	4
MAT 111		4 PHY 112	4
PHY 111		4 General Ed Course	4
General Ed Course		4 General Ed Course	4
		16	16
Second Year			
Fall	Credits	Spring	Credits
PHY 211		4 MAT 310	4
MAT 210		4 PHY 252	4
General Ed Course		4 PHY 292	1
General Ed Course		4 General Ed Course	4
		General Ed Course	4
		16	17
Third Year			
Fall	Credits	Spring	Credits
PHY 321, 322, 323, or 324		4 PHY 321, 322, 323, or 324	4
PHY 391		1 PHY 392	1

General Ed Course	4 PHY 352 or 354	4
General Ed Course	4 General Ed Course	4
Elective Course	4 Elective Course	4
	17	17
Fourth Year		
Fall	Credits Spring	Credits
PHY 321, 322, 323, or 324	4 PHY 3XX	4
PHY 451	4 PHY 492	1
PHY 491	1 Elective Course	4
Elective Course	3 PHY SCE	4
Elective Course	4	
	16	13

Total Credits 128

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Minor

- Earth and Planetary Science Minor (<https://catalog.washcoll.edu/catalog/interdisciplinary/earth-planetary-science-minor/>)
- Physics Minor (<https://catalog.washcoll.edu/catalog/departments-programs/physics/physics-minor/>)

Certificate

- Secondary Education Certification Program (<https://catalog.washcoll.edu/catalog/departments-programs/education/secondary-education-certification-program/>)

Pre-Professional

- Pre-Engineering (<https://catalog.washcoll.edu/catalog/professional-programs/pre-engineering/>)