Physics (BA/BS)

Explore the laws of nature and the relationship between energy and matter with the Department of Physics. You will have the opportunity to research with award-winning faculty, participate in practical applications such as labs and demonstrations, and develop career skills through internships. We encourage physics majors to study across disciplines, pairing their work with chemistry, biology, or anything else of interest—at the University of Oregon, you have the freedom to choose your own path.

A degree in physics will give you a solid foundation to pursue careers and graduate studies in astrophysics, engineering, teaching, astronomy, medicine, technology, communication, and a host of other disciplines.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Have knowledge of principles and concepts for specific core subject areas listed above.
- Apply principles and concepts to analyze problems within specific core areas.
- Have capability with quantitative methods appropriate for the core areas.
- Analyze and interpret quantitative results.
- Have experience with integration of concepts: analysis of complex problems cutting across multiple core areas.
- Collect and appropriately analyze data working independently and in collaboration with others (experimentation; data collection, reduction and analysis; model-based computation including simulations and inversion of observations; and literature research using basic and state-of-the-art technology).
- Communicate orally and in writing by making appropriate use of current presentation technology.
- Have familiarity with current developments in physics.

Physics Major Requirements

Courses used to fulfill the major requirements must be taken for letter grade. Coursework transferred in from Advanced Placement or International Baccalaureate exams are acceptable with a mark of P*.

Physics majors must keep an average Physics GPA of 2.0 or better in all Physics/Astronomy Courses.

Code	Title	Credits
Physics Core Courses		
MATH 251Z–253Z	Calculus: Differential, Integral, and Sequences & Series	12
MATH 256	Introduction to Differential Equations	4
MATH 281–282	Several-Variable Calculus I-II	8
PHYS 251–253	Foundations of Physics I	12
PHYS 290	Foundations of Physics Laboratory [1]	2
PHYS 351–353	Foundations of Physics II	12
PHYS 391	Physics Experimentation Data Analysis Laboratory	4
Interdisciplinary Science Core		
Two from the following: [2]		8
CH 221Z	General Chemistry I	
CH 222Z	General Chemistry II	
CH 224H	Advanced General Chemistry I	
CH 225H	Advanced General Chemistry II	
BI 221Z	Principles of Biology I: Cells	
BI 222Z	Principles of Biology II: Organisms	
BI 223Z	Principles of Biology III: Ecology and Evolution	
CS 210	Computer Science I	
CS 211	Computer Science II	
CS 212	Computer Science III	
ERTH 201	Dynamic Planet Earth	
HPHY 212	Scientific Investigation in Physiology	
Astronomy or Physics Upper-Division Courses [3]		**30**
Total Credits		**92**

1. To be repeated, totaling 2 credits.
2. Students are strongly urged to complete this requirement in the first two years.
3. Students must complete a minimum of 6 credits in upper-division laboratory courses from any combination of PHYS 401, 424, 425, 431, 432, 481, 491, 492, and 493. A maximum of 12 credits from these courses may count toward the major.

Honors

To be recommended by the faculty for graduation with honors in physics, a student must complete at least 46 credits in upper-division physics courses, of which at least 40 credits must be taken for letter grades, and earn at least a 3.50 grade point average in these courses.

As an alternative, undergraduate research leading to the defense of a thesis accompanied by at least a 3.30 grade point average can lead to recommendation for graduation with honors. Contact the director of undergraduate studies for more information.

Four-Year Degree Plan

Bachelor of Arts in Physics

Course	Title	Credits	Milestones
First Year			
Fall			
PHYS 251 or PHYS 201	Foundations of Physics I or General Physics	4	
PHYS 290	Foundations of Physics Laboratory	1	
CH 221Z	General Chemistry I	4	
MATH 251Z or MATH 111Z or MATH 112Z	Differential Calculus or Precalculus I: Functions or Precalculus II: Trigonometry	4	
WR 121Z	Composition I	4	
	Credits	**17**	

Winter		
PHYS 252	Foundations of Physics I	4
or MATH 251Z	or Differential Calculus or Precalculus II: Trigonometry	
or MATH 112Z		
PHYS 290	Foundations of Physics Laboratory	1
CH 222Z	General Chemistry II	4
MATH 252Z	Integral Calculus	4
WR 122Z	Composition II	4
	Credits	**17**
Spring		
PHYS 253	Foundations of Physics I	4
or MATH 251Z	or Differential Calculus	
PHYS 290	Foundations of Physics Laboratory	1
MATH 253Z	Calculus: Sequences and Series	4
or MATH 251Z	or Differential Calculus	
CS 210	Computer Science I	4
Core-education course in arts and letters		4
	Credits	**17**
Second Year		
Fall		
PHYS 351	Foundations of Physics II	4
MATH 281	Several-Variable Calculus I	4
or MATH 253Z	or Calculus: Sequences and Series	
PHYS 391	Physics Experimentation Data Analysis Laboratory	4
Core-education course in arts and letters		4
	Credits	**16**
Winter		
PHYS 353	Thermal Physics and Statistical Mechanics II	4
MATH 282	Several-Variable Calculus II	4
or MATH 281	or Several-Variable Calculus I	
Core-education course in social science		4
Core-education course that also satisfies a cultural literacy requirement		4
	Credits	**16**
Spring		
PHYS 353	Thermal Physics and Statistical Mechanics II	4
MATH 256	Introduction to Differential Equations	4
or MATH 282	or Several-Variable Calculus II	
Core-education course in arts and letters		4
Core-education course in social science		4
	Credits	**16**
Third Year		
Fall		
PHYS 412	Electricity and Magnetism I	4
Core-education course in arts and letters		4
Core-education course that also satisfies a cultural literacy requirement		4
First term of 1st-year second-language sequence		4
	Credits	**16**
Winter		
PHYS 411	Mechanics	4
PHYS 413	Electricity and Magnetism II	4
Core-education course in social science		4
Second term of 1st-year second-language sequence		4
	Credits	**16**
Spring		
PHYS 422	Electromagnetism	4
Third term of 1st-year second-language sequence		4
Core-education course in social science		4
Elective course		4
	Credits	**16**
Fourth Year		
Fall		
PHYS 414	Quantum Physics	4
First term of 2nd-year second-language sequence		4
Elective course		4
	Credits	**12**
Winter		
PHYS 415	Quantum Physics	4
PHYS 431	Analog Electronics	4
Second term of 2nd-year second-language sequence		4
	Credits	**12**
Spring		
PHYS 417	Topics in Quantum Physics	4
PHYS 432	Digital Electronics	4
Third term of 2nd-year second-language sequence		4
	Credits	**12**
	Total Credits	**183**

Bachelor of Science in Physics

Course	Title	Credits	Milestones
First Year			
Fall			
PHYS 251	Foundations of Physics I	4	
PHYS 290	Foundations of Physics Laboratory	1	
CH 221Z	General Chemistry I	4	
MATH 251Z	Differential Calculus	4	
WR 121Z	Composition I	4	
	Credits	**17**	
Winter			
PHYS 252	Foundations of Physics I	4	
PHYS 290	Foundations of Physics Laboratory	1	
CH 222Z	General Chemistry II	4	
MATH 252Z	Integral Calculus	4	
WR 122Z	Composition II	4	
	Credits	**17**	

Spring		
PHYS 253	Foundations of Physics I	4
PHYS 290	Foundations of Physics Laboratory	1
MATH 253Z	Calculus: Sequences and Series	4
CS 210	Computer Science I	4
Core-education course in arts and letters		4
	Credits	**17**
Second Year		
Fall		
PHYS 351	Foundations of Physics II	4
PHYS 391	Physics Experimentation Data Analysis Laboratory	4
MATH 281	Several-Variable Calculus I	4
Core-education course in arts and letters		4
	Credits	**16**
Winter		
PHYS 352	Thermal Physics and Statistical Mechanics I	4
MATH 282	Several-Variable Calculus II	4
Core-education course in social science		4
Core-education course that also satisfies a cultural literacy requirement		4
	Credits	**16**
Spring		
PHYS 353	Thermal Physics and Statistical Mechanics II	4
MATH 256	Introduction to Differential Equations	4
Core-education course in arts and letters		4
Core-education course in social science		4
	Credits	**16**
Third Year		
Fall		
PHYS 412	Electricity and Magnetism I	4
Core-education course in arts and letters		4
Core-education course in social science		4
Core-education course that also satisfies a cultural literacy requirement		4
	Credits	**16**
Winter		
PHYS 411	Mechanics	4
PHYS 413	Electricity and Magnetism II	4
Core-education course in social science		4
Elective course		4
	Credits	**16**
Spring		
PHYS 422	Electromagnetism	4
Elective courses		12
	Credits	**16**
Fourth Year		
Fall		
PHYS 414	Quantum Physics	4
Elective courses		8
	Credits	**12**
Winter		
PHYS 415	Quantum Physics	4
PHYS 431	Analog Electronics	4
Elective course		4
	Credits	**12**
Spring		
PHYS 417	Topics in Quantum Physics	4
PHYS 432	Digital Electronics	4
Elective course		4
	Credits	**12**
	Total Credits	**183**