

Physics (BS): Interdisciplinary Physics Concentration

To see more about what you will learn in this program, visit the Learning Outcomes website (<https://apps.oirp.ncsu.edu/pgas/>)!

Overview

Physics provides the conceptual foundation for science and engineering. A physics degree is a mark of major intellectual achievement and a gateway to a thousand careers. In the modern world, physicists often interact with a large number of other disciplines to address pressing academic and applied problems.

Most physics majors find employment in a government or industrial laboratory, or with a company that provides STEM (science, technology, engineering and math) products or services. Other physics majors go on to graduate studies in physics or related sciences, or professional schools (such as medicine or law).

The Interdisciplinary Physics Concentration at NC State allows students to customize a highly technical Bachelor of Science degree in consultation with an expert Faculty advisor. The combinations of different scientific fields that can be incorporated into the Interdisciplinary concentration are almost limitless. Examples include biophysics, geophysics, mathematical physics, and data science.

For more information about this program, visit our website (<https://physics.sciences.ncsu.edu/undergraduate/>).

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Plan Requirements

Code	Title	Hours	Counts towards
Orientation			
COS 100	Science of Change (Verify Requirement)		
Communication			
ENG 101	Academic Writing and Research	4	
	Select one of the following Advanced Writing courses:	3	

ENG 331	Communication for Engineering and Technology	
ENG 332	Communication for Business and Management	
ENG 333	Communication for Science and Research	

Physics ¹

PY 201	University Physics I	4
PY 202	University Physics II	4
PY 203	University Physics III	4
PY 252	Instrumental and Data Analysis for Physics	2
PY 401	Quantum Physics I	3
PY 411	Mechanics I	3
PY 413	Thermal Physics	3
PY 414	Electromagnetism I	3

Advanced Experimental Physics (p. 3) 3

Math / Statistics / Computing ²

MA 141	Calculus I	4
MA 241	Calculus II	4
MA 242	Calculus III	4
MA 341	Applied Differential Equations I	3

Advanced Math Elective (p. 3) 3

Statistics Elective (p. 2) 3

PY 251	Introduction to Scientific Computing	3
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Computing / Numerical Methods Elective (p. 2) 3

Other Science/Engineering ³

CH 101	Chemistry - A Molecular Science	3
CH 102	General Chemistry Laboratory	1

Basic Science Elective (p. 2) 3

Advised Science/Engineering Electives ⁴ 18

GEP Courses

GEP Humanities (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/>) 6

GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)	6
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)	2
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)	5
GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)	3
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)	
Foreign Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/) (verify requirement)	
Free Electives	
Free Electives	10
Total Hours	120

- ¹ At most one passing grade below C- is permitted in the Physics category.
- ² At most one passing grade below C- is permitted in the Math/Statistics/Computing category.
- ³ At most one passing grade below C- is permitted in the Other Science/Engineering category.
- ⁴ Students in the Interdisciplinary Physics option for the B.S. in Physics will identify a second area of interest in which to also focus their studies. These 18 credit hours will be planned by the student in consultation with their advisor and must be approved by the advisor and by the program, to ensure sufficient breadth and depth of study. This second disciplinary focal area can be selected from a wide range of fields in science or engineering. Students should check the prerequisites and restrictions on courses in which they are interested.

Statistics Electives

Code	Title	Hours	Counts towards
BUS 350	Economics and Business Statistics	3	
EC 351	Econometrics I	3	
ST 307	Introduction to Statistical Programming-SAS	1	

ST 308	Introduction to Statistical Programming - R	1
ST 311	Introduction to Statistics	3
ST 312	Introduction to Statistics II	3
ST 350	Economics and Business Statistics	3
ST 370	Probability and Statistics for Engineers	3
ST 371	Introduction to Probability and Distribution Theory	3
ST 372	Introduction to Statistical Inference and Regression	3

Computing / Numerical Methods Electives

Code	Title	Hours	Counts towards
CSC 302	Introduction to Numerical Methods	3	
CSC 427	Introduction to Numerical Analysis I	3	
CSC 428	Introduction to Numerical Analysis II	3	
MA 402	Mathematics of Scientific Computing	3	
MA 427	Introduction to Numerical Analysis I	3	
MA 428	Introduction to Numerical Analysis II	3	
PY 525	Computational Physics	3	

Basic Science Elective

Code	Title	Hours	Counts towards
BIO 165	Introduction to Environmental Research	5	
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	
BIO 183	Introductory Biology: Cellular and Molecular Biology	4	

CE 225	Mechanics of Solids	3
CH 201	Chemistry - A Quantitative Science	3
CH 202	Quantitative Chemistry Laboratory	1
CH 203	General Chemistry II for Students in Chemical Sciences	3
CH 204	General Chemistry Laboratory II for Students in Chemical Sciences	1
CH 220	Introductory Organic Chemistry	3
CH 222	Organic Chemistry I Lab	1
CHE 205	Chemical Process Principles	4
GN 301	Genetics in Human Affairs	3
MAE 214	Solid Mechanics	3
MEA 101	Geology I: Physical	3
MEA 110	Geology I Laboratory	1
MEA 200	Introduction to Oceanography	3
MEA 210	Oceanography Lab	1
MEA 215	Introduction to Atmospheric Sciences	4
MEA 220	Marine Biology	3
MSE 200	Mechanical Properties of Structural Materials	3
MSE 201	Structure and Properties of Engineering Materials	3
NE 202	Radiation Sources, Interaction and Detection	4
TE 200	Introduction to Polymer Science and Engineering	3

Advanced Experimental Physics

Code	Title	Hours	Counts towards
MA 305	Introductory Linear Algebra and Matrices	3	
MA 401	Applied Differential Equations II	3	
MA 405	Introduction to Linear Algebra	3	

Advanced Math Elective

Code	Title	Hours	Counts towards
MA 305	Introductory Linear Algebra and Matrices	3	
MA 401	Applied Differential Equations II	3	
MA 405	Introduction to Linear Algebra	3	

First Year

Fall Semester		Hours
PY 201	University Physics I (CP) ¹	4
MA 141	Calculus I (CP) ²	4
ENG 101	Academic Writing and Research	4
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
COS 100	Science of Change	2
Hours		15

Spring Semester

PY 202	University Physics II (CP) ¹	4
MA 241	Calculus II (CP) ²	4
CH 101	Chemistry - A Molecular Science ³	3
CH 102	General Chemistry Laboratory ³	1
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
Hours		15

Second Year

Fall Semester		Hours
PY 203	University Physics III (CP) ¹	4
PY 251	Introduction to Scientific Computing ²	3
MA 242	Calculus III (CP) ²	4
Basic Sciences (p. 2) ³		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
Hours		15

Spring Semester

PY 252	Instrumental and Data Analysis for Physics ¹	2
PY 411	Mechanics I (CP) ¹	3

MA 341	Applied Differential Equations I ²	3
	Advised Science/Engineering Elective ^{3,4}	3
	GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)	3
Hours		14
Third Year		
Fall Semester		
PY 414	Electromagnetism I ¹	3
	Advised Science/Engineering Elective ^{3,4}	3
	Advanced Math Elective (p. 3) ²	3
	Statistics Elective (p. 2) ²	3
	Advanced Writing Elective (p. 1)	3
Hours		15
Spring Semester		
PY 401	Quantum Physics I ¹	3
PY 413	Thermal Physics ¹	3
	Advised Science/Engineering Elective ^{3,4}	3
	GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)	3
	Free Elective	3
Hours		15
Fourth Year		
Fall Semester		
	Computing/Numerical Methods Elective (p. 2) ²	3
	Advised Science/Engineering Electives ^{3,4}	6
	GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)	3
	Free Elective	4
Hours		16
Spring Semester		
	Advanced Experimental Physics (p. 3) ¹	3
	Advised Science/Engineering Elective ^{3,4}	3
	GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)	3
	GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)	3
	Free Elective	3
Hours		15
Total Hours		120

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