

# B.S. IN PURE PHYSICS

## Overview

The pure physics major is recommended for students intending to enter graduate school in Physics, or that want a deeper understanding of fundamental physics.

It consists of one of the University Physics sequences with two labs, plus PHY 306 (lab), PHY 321, PHY 340, PHY 350, PHY 351, PHY 360, PHY 362, PHY 506 (lab), PHY 540, and PHY 560.

Students interested in a Ph.D. program in physics are strongly encouraged to also take PHY 561.

To satisfy the College of Arts and Sciences writing requirement in the discipline, students majoring in Pure Physics are required to pass at least one writing intensive course within the Physics Department. These are PHY 306, PHY 362, and PHY 506. The requirement can also be fulfilled by passing WRS 233 with a grade of C- or higher.

## Curriculum Requirements

Code	Title	Credit Hours
<b>University Physics Sequence</b>		<b>10-11</b>
Option 1:		
PHY 221	University Physics I	
PHY 222	University Physics II	
PHY 223	University Physics III	
PHY 224	University Physics II Lab	
PHY 225	University Physics III Lab	
Option 2:		
PHY 221	University Physics I	
PHY 230	Honors University Physics II-III	
PHY 224	University Physics II Lab	
PHY 225	University Physics III Lab	
Option 3:		
PHY 201	University Physics I for the Sciences	
PHY 202	University Physics II for the Sciences	
PHY 106 or PHY 224	College Physics Laboratory I University Physics II Lab	
PHY 108 or PHY 225	College Physics Laboratory II University Physics III Lab	
Option 4:		
PHY 211	University Physics I for PRISM	
PHY 212	University Physics II for PRISM	
PHY 106 or PHY 224	College Physics Laboratory I University Physics II Lab	
PHY 108 or PHY 225	College Physics Laboratory II University Physics III Lab	
<b>Upper Level Courses</b>		
PHY 306	Intermediate Laboratory	1
PHY 321	Thermodynamics and Kinetic Theory	3
PHY 340	Classical Mechanics I	3
PHY 350	Intermediate Electricity and Magnetism	3
PHY 351	Intermediate Electricity and Magnetism II	3
PHY 360	Introduction to Modern Physics	3
PHY 362	Modern Physics Honors Seminar	1
PHY 506	Advanced Laboratory	1-2
PHY 540	Classical Mechanics II	3
PHY 560	Quantum Mechanics and Modern Physics I	3

<b>Math Requirements</b>		
MTH 151 or MTH 161 or MTH 171	Calculus I for Engineers Calculus I Calculus I	5
MTH 162 or MTH 172	Calculus II Calculus II	4
MTH 210	Introduction to Linear Algebra	3
MTH 211 or MTH 310	Calculus III Multivariable Calculus	3
MTH 311	Introduction to Ordinary Differential Equations	3
<b>General Education Requirements</b>		
Written Communication Skills:		
WRS 105	First-Year Writing I	3
WRS 106 or ENG 106	First-Year Writing II Writing About Literature and Culture	3
Quantitative Skills:		
MTH 151 or MTH 161 or MTH 171	Calculus I for Engineers Calculus I Calculus I	fulfilled through the major
Areas of Knowledge:		
Arts and Humanities Cognate		9
People and Society Cognate		9
STEM Cognate (9 credits) (fulfilled through the major)		
<b>Additional Requirements</b>		
CSC 120	Computer Programming I	4
200-level language course		3
Electives		37
<b>Total Credit Hours</b>		<b>120-122</b>

## Plan of Study

<b>Year One</b>		
<b>Fall</b>		<b>Credit Hours</b>
PHY 221	University Physics I	3
MTH 151	Calculus I for Engineers	5
WRS 105	First-Year Writing I	3
CSC 120	Computer Programming I	4
<b>Credit Hours</b>		<b>15</b>
<b>Spring</b>		
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
PHY 315	Mathematical Tools for Physics	3
MTH 162	Calculus II	4
WRS 106 or ENG 106	First-Year Writing II or Writing About Literature and Culture	3
Cognate		3
<b>Credit Hours</b>		<b>17</b>
<b>Year Two</b>		
<b>Fall</b>		
PHY 223	University Physics III	3
PHY 225	University Physics III Lab	1
PHY 360	Introduction to Modern Physics	3
PHY 362	Modern Physics Honors Seminar	1

MTH 210	Introduction to Linear Algebra	3
Language 101		3
Cognate		3
	<b>Credit Hours</b>	<b>17</b>
<b>Spring</b>		
PHY 340	Classical Mechanics I	3
PHY 306	Intermediate Laboratory	1
MTH 211	Calculus III	3
Language 102		3
Cognate		3
Elective		3
	<b>Credit Hours</b>	<b>16</b>
<b>Year Three</b>		
<b>Fall</b>		
PHY 350	Intermediate Electricity and Magnetism	3
MTH 311	Introduction to Ordinary Differential Equations	3
Language 201		3
Cognate		3
Elective		3
	<b>Credit Hours</b>	<b>15</b>
<b>Spring</b>		
PHY 321	Thermodynamics and Kinetic Theory	3
PHY 351	Intermediate Electricity and Magnetism II	3
MTH 224	Introduction to Probability and Statistics	3
Cognate		3
Elective		3
	<b>Credit Hours</b>	<b>15</b>
<b>Year Four</b>		
<b>Fall</b>		
PHY 540	Classical Mechanics II	3
PHY 560	Quantum Mechanics and Modern Physics I	3
Cognate		3
Elective		3
	<b>Credit Hours</b>	<b>12</b>
<b>Spring</b>		
PHY 506	Advanced Laboratory	1-2
PHY 561	Quantum Mechanics and Modern Physics II	3
Electives		9
	<b>Credit Hours</b>	<b>13-14</b>
	<b>Total Credit Hours</b>	<b>120-121</b>

## Mission

The mission of the Physics B.S. program is to provide students with a rigorous grounding in classical and modern theory, experience in advanced experimental techniques, and exposure to a broad spectrum of topics in physics research.

## Goals

It is expected that graduates will be capable problem solvers, proficient critical and scientific thinkers, and possess backgrounds that prepare them for success in graduate school or their desired career path. Graduates will also be able to communicate their scientific ideas in written form to both scientifically literate and general audiences.

## Student Learning Outcomes

- Students will demonstrate the ability to solve problems in classical and modern physics and proficiency in theoretical and applied mathematics, making them competitive in their application at top graduate programs and/or in the job market.
- Students will be exposed to and engaged in forefront physics research. Students will learn first hand how research is performed in one of our labs, while contributing to one of our active research programs.
- Students will be able to report their work/ideas in written form to both the scientific community and a broader audience.