

# PHYSICS, B.S.

## Mission

The mission of the Bachelor of Science in Physics (<https://www.biola.edu/degrees/u/physics-bs/>) is to train and mentor students to become skilled scientists who will glorify God and be good stewards of His creation as they serve others in research, academia, and industry.

## Degree Program

A Bachelor of Science degree in Physics is offered upon completion of the University baccalaureate requirements and the departmental specific requirements.

## Learning Outcomes

### Program Learning Outcomes

Upon completion of the Bachelor of Science in Physics, students will be able to:

1. Demonstrate an understanding of the foundational principles of physics (ULO 1).
2. Demonstrate an ability to solve quantitative, qualitative, and technical problems related to physics. (ULO 1).
3. Demonstrate safe laboratory technique, proper use of appropriate equipment, and suitable results and data analysis (ULO 1).
4. Obtain and use appropriate physics-related literature and resource materials (ULO 1).
5. Summarize the key issues in science and faith and recognize the harmony possible while studying God's creation (ULO 1, 2, and 3).

Each Program Learning Outcome (PLO) listed above references at least one of the University Learning Outcomes (ULO 1, 2, 3), which may be found in the General Information section (<https://catalog.biola.edu/general-information/#UniversityLearningOutcomes>) of this catalog.

## Program Requirements

### GPA Requirement

To continue in the program a student is required to have a cumulative GPA of 2.5 or higher in their first year of chemistry, physics and/or math courses taken at Biola. These courses may include: CHEM 105, CHEM 115, MATH 150, MATH 151, PHSC 132, and PHSC 134.

### Integration Seminar Requirement

Students enrolled in the Bachelor of Science in Physics degree program are required to take BBST 4653 Integration Seminar: Christianity and the Natural Sciences, or another approved Integration Seminar topic (see advisor).

## Curriculum Requirements

Code	Title	Credits
Physics majors meet the Core Curriculum requirement of 9 credits in integration seminar, science, and mathematics within the major. The foreign language requirement is met by two years of high school study in the same language or four credits of college foreign language. ENGL 3133 is recommended.		
<b>Program Courses</b>		
CHEM 107	Introduction to Chemistry <sup>1</sup>	3
CHEM 105 & CHEM 115	General Chemistry I and General Chemistry I Lab	4
CHEM 106 & CHEM 116	General Chemistry II and General Chemistry II Lab	4
MATH 150	Calculus I	4
MATH 151	Calculus II	4
MATH 250	Calculus III	4
MATH 335	Ordinary Differential Equations	3
PHSC 124	Data Analysis and Presentation	1
PHSC 132 & PHSC 134	General Physics I: Mechanics and Heat and General Physics I Laboratory	4
PHSC 233 & PHSC 237	General Physics II: Electricity and Magnetism and General Physics II Laboratory	4
PHSC 234	General Physics III: Waves, Optics and Modern Physics	4
PHSC 311	Computer Techniques in Science and Engineering	3
PHSC 318	Classical Mechanics	3
PHSC 321	Circuits and Instrumentation I	5
PHSC 336	Mathematical Methods in Physics	3
PHSC 340	Electrodynamics	3
PHSC 412	Introduction to Quantum Mechanics	3
PHSC 460	Capstone Seminar	1
PHSC 480	Advanced Physics Laboratory	3
Select at least 3 credits of upper-division Physics electives.		3
BBST 4653	Integration Seminar: Christianity and the Natural Sciences <sup>2</sup>	3
<b>Program Course Requirements: 66-69 credits</b>		
<b>Core Curriculum Requirements (<a href="https://catalog.biola.edu/academic-policies/undergraduate-core-curriculum-program/">https://catalog.biola.edu/academic-policies/undergraduate-core-curriculum-program/</a>)</b>		<b>54-58</b>
<b>Total Credits</b>		<b>120-127</b>

<sup>1</sup> CHEM 107 is waived for students who meet the qualifications to enter CHEM 105. See the current Placement Options for CHEM 105 (<https://www.biola.edu/academic-advising/incoming/placement-exams/chemistry-105/>) for more information.

<sup>2</sup> Fulfills the BBST 465 Biblical and Theological Studies Integration Seminar requirement.

## Course Sequence

**NOTE:** The course sequence table is designed by the major department and is one way that the classes will work out properly in sequence for your major. However, there are alternative or flexible ways to rotate some of the classes within the same year/level and sometimes between year levels. Please contact your major department advisor to discuss flexible alternatives in scheduling the sequence of your classes.

Taking coursework during the summer session may also be an option to accelerate your degree path.

See Core Curriculum Program section (<https://catalog.biola.edu/academic-policies/undergraduate-core-curriculum-program/>) for a list of approved Core Curriculum courses.

### Physics, B.S.

#### First Year

Fall	Credits Spring	Credits
BBST 103 or 165	3 BBST 103 or 165	3
CHEM 107 (if needed per Department)	3 KNES 107	1
ENGL 100 or 112	3 MATH 151	4
GNST 102	1 PHSC 132 & PHSC 134	4
MATH 150	4 Communication (see Core Curriculum)	3
PHSC 124	1	
	<b>15</b>	<b>15</b>

#### Second Year

Fall	Credits Spring	Credits
BBST 209 or 210	3 BBST 209 or 210	3
MATH 250	4 BBST 251	3
PHSC 233 & PHSC 237	4 MATH 335	3
PHSC 311	3 PHSC 234	4
Behavioral Science (see Core Curriculum)	3 PHSC 321	5
	<b>17</b>	<b>18</b>

#### Third Year

Fall	Credits Spring	Credits
BBST 365	3 BBST 300/400 Bible Elective	3
CHEM 105 & CHEM 115	4 BBST 354	3
ENGL 3133 (recommended; fulfills ENGL 313 Core Curriculum requirement)	3 CHEM 106 & CHEM 116	4
PHSC 336	3 HIST 200, 201, or POSC 225	3
Philosophy (see Core Curriculum)	3 PHSC 318	3
Writing Competency Requirement	KNES Activity (see Core Curriculum)	1
	Graduation Application due in Registrar's Office	
	<b>16</b>	<b>17</b>

#### Fourth Year

Fall	Credits Spring	Credits
BBST 300/400 Bible Elective	3 BBST 4653 (fulfills BBST 465 Integration Seminar requirement)	3
PHSC 340	3 PHSC 412	3
Physics Elective (upper-division) <sup>1</sup>	3 PHSC 460	1

Foreign Language (see Core Curriculum) <sup>2</sup>	4 PHSC 480	3
Literature (see Core Curriculum)	3 Fine Arts (see Core Curriculum)	3
	<b>16</b>	<b>13</b>

#### Total Credits 127

<sup>1</sup> See catalog for electives in area of specialization.

<sup>2</sup> If you have taken 2 years of the same foreign language in high school, you have fulfilled your foreign language requirement. Otherwise, contact the Modern Languages Department for placement test instructions to fulfill the 4-credit requirement.

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### Physics, B.S.

#### First Year

Fall	Credits Spring	Credits
HNRS 101	4 HNRS 105	4
HNRS 102	4 HNRS 106	4
CHEM 107 (if needed per Department)	3 KNES 107	1
GNST 102	1 MATH 151	4
MATH 150	4 PHSC 132 & PHSC 134	4
PHSC 124	1	
	<b>17</b>	<b>17</b>

#### Second Year

Fall	Credits Spring	Credits
HNRS 210	4 HNRS 230	4
HNRS 215	4 HNRS 231	4
MATH 250	4 MATH 335	3
PHSC 233 & PHSC 237	4 PHSC 234	4
KNES Activity (see Core Curriculum)	1	
	<b>17</b>	<b>15</b>

#### Third Year

Fall	Credits Spring	Credits
HNRS 324	4 HNRS 337	4
HNRS 326	2 HNRS 339	2
PHSC 311	3 PHSC 318	3
PHSC 336	3 PHSC 321	5
Foreign Language (see Core Curriculum)	4	
Writing Competency Requirement		
	<b>16</b>	<b>14</b>

**Fourth Year**

<b>Fall</b>	<b>Credits Spring</b>	<b>Credits</b>
HNRS 443	4 HNRS 458	4
BBST 4653 (fulfills BBST 465 Integration Seminar requirement)	3 CHEM 106 & CHEM 116	4
CHEM 105 & CHEM 115	4 PHSC 412	3
PHSC 340	3 PHSC 460	1
PHSC Elective (upper-division)	3 PHSC 480	3
	<b>17</b>	<b>15</b>

**Total Credits 128**