

PHYSICAL SCIENCE, B.S.

Mission

The mission of the Bachelor of Science in Physical Sciences 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, education, and industry.

Degree Program

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

Learning Outcomes

Program Learning Outcomes

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

1. Demonstrate an understanding of the foundational principles related to the physical sciences (ULO 1).
2. Demonstrate an ability to solve quantitative, qualitative, and technical problems related to physical science (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 literature and resource materials related to the physical sciences (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 (<http://catalog.biola.edu/general-information/>) section of this catalog.

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. Depending on the major, these courses may include: CHEM 105, MATH 105, MATH 106, PHSC 132, PHSC 134, PHSC 233, PHSC 237.

Integration Seminar Requirement

Students enrolled in the Bachelor of Science in Physical Science degree program are required to take BBST 465 as 'Christianity and the Natural Sciences,' or another approved Integration Seminar topic (see advisor).

Curriculum Requirements

Code	Title	Credits
Program-Specific Core Curriculum Courses		
Physical Science majors automatically meet the Core Curriculum requirement of 6 credits of science and mathematics. The foreign language requirement is met by two years in high school or 4 credits of college foreign language.		
Program Courses		

CHEM 105	General Chemistry I	4
CHEM 106	General Chemistry II	4
MATH 105	Calculus I	4
MATH 106	Calculus II	4
PHSC 124	Data Analysis and Presentation	1
PHSC 132	General Physics I: Mechanics and Heat	3
PHSC 134	General Physics I Laboratory	1
PHSC 233	General Physics II: Electricity and Magnetism	3
PHSC 237	General Physics II Laboratory	1
PHSC 234	General Physics III: Waves, Optics and Modern Physics	4
PHSC 460	Capstone Seminar	1

Select 30 credits (23 credits if choosing a Secondary Instruction concentration) of Chemistry, Physics, Computer Science, or Math courses; of which 23 credits must be upper-division. Depending on the student's interests in science and career goals, the following are recommended electives:

BIOS 103	Introduction to Environmental Science	23 or 30
CHEM 301	Organic Chemistry I	
CHEM 302	Organic Chemistry II	
CHEM 311	Laboratory in Organic Chemistry I	
CHEM 312	Laboratory in Organic Chemistry II	
CHEM 321 & CHEM 322	Basic Organic and Biochemistry and Basic Organic and Biochemistry Lab	
MATH 205	Calculus III	
MATH 291	Linear Algebra	
MATH 335	Ordinary Differential Equations	
PHSC 103	Geology	
PHSC 110	Astronomy	
PHSC 311	Computer Techniques in Science and Engineering	
PHSC 313	Statics	
PHSC 321	Circuits and Instrumentation I	
PHSC 322	Circuits and Instrumentation II	

Total Credits 60

Concentrations

Secondary Instruction

In addition to the Core Requirements listed above, students must complete the following requirements for a total of 70 credits.

Code	Title	Credits
Concentration-Specific Core Curriculum Courses		
The following course is required to fulfill the Core Curriculum requirement for Behavioral Science:		
PSYC 200	Introduction to Psychology	
Concentration Courses		
LEDU 301	Introduction to Teaching	3
LEDU 330	Psychological Foundations of Education	3

LEDU 341	Methods of Teaching Linguistically Diverse Students	3
LEDU 425	Secondary Content Area Reading	3
LEDU 433	Single Subject Pedagogy	2
LEDU 438	Secondary Curriculum, Differentiation, and Assessment	3

Student teaching (12 credits) may be completed at the graduate level and is not required for undergraduate graduation.

LEDU 450	Secondary Student Teaching I ¹	
LEDU 452	Secondary Student Teaching II	

Elective Courses

Select 23 credits of upper-division courses in Physics, Chemistry, Computer Science, or Math. Depending on the student's interests in science, the courses listed under Elective Requirements above are recommended electives. ¹

Total Credits 40

¹ Although it does not count toward the major, students may elect to take PHSC 326 as a formal review and preparation for the CSET exams.

Secondary Education Minor

The School of Education offers a state-approved professional teacher preparation program which leads to a preliminary single subject teaching credential in the state of California. The Single Subject credential authorizes the holder to teach the specific subject named on the credential. In most cases individuals with this credential will be offered employment in middle schools and high schools. The teacher preparation program can be added as a minor to any major; however, candidates are advised to major in the subject area they wish to teach. Candidates who take the following 17 credits qualify for a Secondary Education Minor.

Code	Title	Credits
LEDU 301	Introduction to Teaching	3
LEDU 330	Psychological Foundations of Education	3
LEDU 341	Methods of Teaching Linguistically Diverse Students	3
LEDU 425	Secondary Content Area Reading	3
LEDU 433	Single Subject Pedagogy	2
LEDU 438	Secondary Curriculum, Differentiation, and Assessment	3
Total Credits		17

The Professional Teacher Preparation Program leading to a California Teaching Credential at Biola University is subject to change in response to new legislation. See a credential analyst in the School of Education for current information on completing the requirements for a teaching credential. Students must consult with both their major advisor and a School of Education advisor.

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 (<http://catalog.biola.edu/general-information/undergraduate-requirements-policies/#text>) for a list of approved Core Curriculum courses.

- Physical Science
- Secondary Instruction

Physical Science, B.S.

First Year

Fall	Credits Spring	Credits
BBST 103 or 165	3 BBST 103 or 165	3
MATH 105	4 MATH 106	4
PHSC 132	3 PHSC 233	3
PHSC 134	1 PHSC 237	1
PHSC 124	1 Communication (see Core Curriculum)	3
ENGL 100 or 112	3 KNES 107	1
GNST 102	1	
		16
Total Credits 31		15

Second Year

Fall	Credits Spring	Credits
BBST 209 or 210	3 BBST 209 or 210	3
PHSC 234	4 BBST 251	3
CHEM, CSCI, MATH, PHSC Elective ¹	4 CHEM, CSCI, MATH, PHSC Elective ¹	3
CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3 CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	4
Philosophy (see Core Curriculum)	3 Fine Arts (see Core Curriculum)	3
		17
Total Credits 33		16

Third Year

Fall	Credits Spring	Credits
BBST 365	3 BBST 354	3
CHEM 105	4 CHEM 106	4
CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3 CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	4
Behavioral Science (see Core Curriculum)	3 Foreign Language (see Core Curriculum)	4
ENGL 313	3 KNES Activity (see Core Curriculum)	1
Writing Competency Requirement	Graduation Petition due in Registrar's Office	
		16
Total Credits 32		16

Fourth Year

Fall	Credits Spring	Credits
BBST 300/400 Bible Elective	3 BBST 465 (Christianity & Nat Sci - required)	3
CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	4 BBST 306, 316, or 326	3

CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3 PHSC 460	1
Literature (see Core Curriculum)	3 CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3
	HIST 200, 201, or POSC 225	3
	13	13

Total Credits 26

¹ See list of electives in catalog.**Physical Science, B.S. Secondary Instruction****First Year**

Fall	Credits Spring	Credits
BBST 103 or 165	3 BBST 103 or 165	3
CHEM 105	4 CHEM 106	4
MATH 105	4 MATH 106	4
PHSC 124	1 PSYC 200 (required)	3
ENGL 100 or 112	3 KNES 107	1
GNST 102	1	
	16	15

Total Credits 31

Second Year

Fall	Credits Spring	Credits
BBST 209 or 210	3 BBST 209 or 210	3
PHSC 132	3 BBST 251	3
PHSC 134	1 PHSC 233	3
CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	4 PHSC 237	1
LEDU 301	3 CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3
Fine Arts (see Core Curriculum)	3 LEDU 330	3
	17	16

Total Credits 33

Third Year

Fall	Credits Spring	Credits
BBST 365	3 BBST 354	3
PHSC 234	4 CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3
CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3 CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3
LEDU 341	3 LEDU 425	3
ENGL 313	3 HIST 200, 201, or POSC 225	3
Writing Competency Requirement	Literature (see Core Curriculum)	3
	Graduation Petition due in Registrar's Office	
	16	18

Total Credits 34

Fourth Year

Fall	Credits Spring	Credits
BBST 300/400 Bible Elective	3 BBST 465 (Christianity & Nat Sci - required)	3

CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	4 BBST 306, 316, or 326	3
Communication (see Core Curriculum)	3 PHSC 460	1
Philosophy (see Core Curriculum)	3 CHEM, CSCI, MATH, PHSC Elective (upper- division) ¹	3
KNES Activity (see Core Curriculum)	1 LEDU 433	2
	LEDU 438	3
	LEDU 450 ²	0
	LEDU 452 ²	0
	14	15

Total Credits 29

¹ See list of electives in catalog.² LEDU 450 (6) and LEDU 452 (6) are not required for graduation; may be completed at graduate level.