COMPUTER SCIENCE, B.S.

Mission

A Bachelor of Science degree in Computer Science (https://www.biola.edu/degrees/u/computer-science-bs/) equips the students with a comprehensive understanding of the theory and practice of computing, providing enriching experiences in theoretically grounded problem solving based on an analysis-design-implementation paradigm. With a holistic perspective of the integration of faith and learning in view, the program prepares the students to embark upon successful careers through which they can reach out to the world for Jesus Christ while serving in secular or faith-based organizations.

Degree Program

A Bachelor of Science degree in Computer Science is offered upon completion of the University baccalaureate requirements and the computer science major in one of the following concentrations: Standard Computer Science or Data Science and Information Systems.

Learning Outcomes
Program Learning Outcomes

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

1. Demonstrate the ability to analyze, model, and solve computing problems (ULO 1, 3).
2. Apply and synthesize knowledge of the theory and practice of computing (ULO 1, 3).
3. Design and develop software programs integrated into functioning systems (ULO 1, 3).
4. Integrate faith and learning in Computer Science (ULO 2).

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
Curriculum Requirements

Code	Title	Credits
Computer Science majors meet the Core Curriculum requirement of 3 credits in 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.		
Program Courses		
All concentrations must include 24 upper-division credits. The following courses are required:		
CSCI 105	Introduction to Computer Science	3
CSCI 106	Data Structures	3
CSCI 220	Computer Organization and Assembly Language Programming	3
CSCI 230	Programming Languages	3
CSCI 430	Computer Communications	3
CSCI 450	Software Engineering	3

Program Course Requirements: 18 credits	
Select a Concentration detailed below	38-39
Core Curriculum Requirements (https://catalog.biola.edu/academic-policies/undergraduate-core-curriculum-program/)	64
Total Credits	**120-121**

Concentrations
Standard Computer Science (38 Credits)

Code	Title	Credits
Concentration Courses		
CSCI 311	Operating Systems	3
CSCI 335	User Interface Design and Programming	3
CSCI 400	Theory of Algorithms	3
Select any two additional CSCI elective courses at the 300 or 400 level [1]		6
MATH 150	Calculus I	4
MATH 151	Calculus II	4
MATH 203	Discrete Structures	3
MATH 291	Linear Algebra	3
MATH 321	Numerical Analysis	3
or MATH 333	Operations Research	
Select two courses at the 300 or 400 level in Computer Science or Math [1]		6
Total Credits		**38**

[1] If CSCI 440 is selected as a CSCI upper-division elective, it may be taken multiple times with different topics

Data Science and Information Systems (39 Credits)

Code	Title	Credits
Concentration Courses		
BUSN 220	Management Information Systems	3
BUSN 323	Business Analytics	3
CSCI 402	Database Management	3
MATH 140	Fundamentals of Calculus	3
or MATH 150	Calculus I	
MATH 203	Discrete Structures	3
MATH 210	Introduction to Probability and Statistics	3
or MATH 318	Biostatistics	
Select any two of the following:		6
CSCI 305	Programming for Data Science I	
CSCI 306	Programming for Data Science II	
CSCI 311	Operating Systems	
CSCI 335	User Interface Design and Programming	
Select any two additional CSCI elective courses at the 300 or 400 level		6
Select any three of the following CSCI/BUSN/MATH Electives:		9
CSCI 104	The Nature of Computing	

CSCI 400	Theory of Algorithms
CSCI 440	Topics in Computer Science [1]
CSCI 480	Internship
BUSN 202	Principles of Microeconomics
BUSN 211	Principles of Accounting I
BUSN 212	Principles of Accounting II
BUSN 370	Business Finance
BUSN 427	Advanced Business Analytics with Machine Learning and AI
MATH 151	Calculus II
MATH 291	Linear Algebra
MATH 319	Statistics II
MATH 321	Numerical Analysis
MATH 331	Probability [2]
MATH 332	Mathematical Statistics
MATH 333	Operations Research
MATH 380	Statistics and Data Science Consulting Practicum
MATH 470	Statistics and Data Science Capstone
Total Credits	**39**

[1]   CSCI 440 may be taken multiple times with different topics.
[2]   Additional courses, which are not program or concentration requirements, are required as prerequisites. See department for advising.

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.

- **Standard Computer Science (p. 2)**
- **Data Science and Information Systems (p. 2)**

Computer Science, B.S. Standard Computer Science (CSST)

First Year

Fall	Credits	Spring	Credits
BBST 103 or 165	3	BBST 103 or 165	3
CSCI 105	3	CSCI 106	3
ENGL 100 or 112	3	KNES 107	1
GNST 102	1	MATH 151	4
MATH 150	4	MATH 203	3
	14		**14**

Second Year

Fall	Credits	Spring	Credits
BBST 209 or 210	3	BBST 209 or 210	3
BBST 251	3	CSCI 220	3
CSCI 230	3	Communication (see Core Curriculum)	3
MATH 291	3	Literature (see Core Curriculum)	3
Foreign Language (see Core Curriculum)	4	Science (see Core Curriculum)	3
	16		**15**

Third Year

Fall	Credits	Spring	Credits
BBST 365	3	BBST 354	3
CSCI 311	3	CSCI 430	3
CSCI 335	3	CSCI or MATH Elective (upper-division)	3
CSCI 400	3	HIST 200, 201, or POSC 225	3
Behavioral Science (see Core Curriculum)	3	MATH 321 or 333	3
		KNES Activity (see Core Curriculum)	1
		Graduation Application due in Registrar's Office	
	15		**16**

Fourth Year

Fall	Credits	Spring	Credits
BBST 300/400 Bible Elective	3	BBST 300/400 Bible Elective	3
CSCI Elective (upper-division)	3	BBST 465	3
CSCI or MATH Elective (upper-division)	3	CSCI 450	3
ENGL 313	3	CSCI Elective (upper-division)	3
Philosophy (see Core Curriculum)	3	Fine Arts (see Core Curriculum)	3
Writing Competency Requirement (https://catalog.biola.edu/academic-policies/undergraduate-requirements-policies/#WritingCompetencyRequiremer			
	15		**15**

Total Credits 120

Computer Science, B.S. Data Science and Information Systems (CSDI)

First Year

Fall	Credits	Spring	Credits
BBST 103 or 165	3	BBST 103 or 165	3
CSCI 105	3	CSCI 106	3
ENGL 100 or 112	3	HIST 200, 201, or POSC 225	3
GNST 102	1	KNES 107	1
MATH 140 or 150	3	MATH 203	3
		MATH 210 or 318	3
	13		**16**

Second Year

Fall	Credits	Spring	Credits
BBST 209 or 210	3	BBST 209 or 210	3
BBST 251	3	CSCI 220	3
BUSN 220	3	CSCI/BUSN/MATH Elective	3
CSCI 230	3	CSCI/BUSN/MATH Elective	3
Foreign Language (see Core Curriculum)	4	Science (see Core Curriculum)	3
	16		**15**

Third Year

Fall	Credits	Spring	Credits
BBST 365	3	BBST 354	3
CSCI 311, 305, or 335	3	CSCI 430	3
CSCI Elective (upper-division)	3	CSCI 306 or CSCI/BUSN/MATH Elective	3
Behavioral Science (see Core Curriculum)	3	Communication (see Core Curriculum)	3
Philosophy (see Core Curriculum)	3	KNES Activity (see Core Curriculum)	1
		Literature (see Core Curriculum)	3
		Graduation Application due in Registrar's Office	
	15		**16**

Fourth Year

Fall	Credits	Spring	Credits
BBST 300/400 Bible Elective	3	BBST 300/400 Bible Elective	3
BUSN 323	3	BBST 465	3
CSCI 402	3	CSCI 450	3
CSCI Elective (upper-division)	3	CSCI 306 or CSCI/BUSN/MATH Elective	3
ENGL 313	3	Fine Arts (see Core Curriculum)	3
Writing Competency Requirement (https://catalog.biola.edu/academic-policies/undergraduate-requirements-policies/#WritingCompetencyRequiremer			
	15		**15**

Total Credits 121

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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.

- **Standard Computer Science (p. 3)**
- **Data Science and Information Systems (p. 3)**

Computer Science, B.S. Standard Computer Science (CSST)

First Year

Fall	Credits	Spring	Credits
HNRS 101	4	HNRS 105	4
HNRS 102	4	HNRS 106	4
CSCI 105	3	CSCI 106	3
GNST 102	1	MATH 151	4
MATH 150	4	MATH 203	3
	16		**18**

Second Year

Fall	Credits	Spring	Credits
HNRS 210	4	HNRS 230	4
HNRS 215	4	HNRS 231	4
CSCI 230	3	CSCI 220	3
MATH 291	3	Foreign Language (see Core Curriculum)	4
Science (see Core Curriculum)	3		
	17		**15**

Third Year

Fall	Credits	Spring	Credits
HNRS 324	4	HNRS 337	4
HNRS 326	2	HNRS 339	2
CSCI 311	3	CSCI 430	3
CSCI 335	3	CSCI Elective (upper-division)	3
CSCI 400	3	MATH 321 or 333	3
Writing Competency Requirement (https://catalog.biola.edu/academic-policies/undergraduate-requirements-policies/#WritingCompetencyRequiremer			
	15		**15**

Fourth Year

Fall	Credits	Spring	Credits
HNRS 443	4	HNRS 458	4
CSCI Elective (upper-division)	3	BBST 465	3
CSCI or MATH Elective (upper-division)	3	CSCI 450	3
KNES 107	1	CSCI or MATH Elective (upper-division)	3
KNES Activity (see Core Curriculum)	1		
	12		**13**

Total Credits 121

Note: Those that took at least 2 years of a foreign language in high school need not take a foreign language class. At most 8 credits may be obtained through KNES classes; at most 8 credits may be obtained through applied music classes. At least one of MATH 321 and MATH 333 must be taken.

Computer Science, B.S. Data Science and Information Systems (CSDI)

First Year

Fall	Credits	Spring	Credits
HNRS 101	4	HNRS 105	4
HNRS 102	4	HNRS 106	4
CSCI 105	3	CSCI 106	3
GNST 102	1	MATH 203	3
MATH 140 or 150	3	MATH 210 or 318	3
	15		**17**

Second Year

Fall	Credits	Spring	Credits
HNRS 210	4	HNRS 230	4
HNRS 215	4	HNRS 231	4
BUSN 220	3	CSCI 220	3
CSCI 230	3	CSCI/BUSN/MATH Elective	3
Foreign Language (see Core Curriculum)	4	CSCI/BUSN/MATH Elective	3
	18		**17**

Third Year

Fall	Credits	Spring	Credits
HNRS 324	4	HNRS 337	4
HNRS 326	2	HNRS 339	2
CSCI 311, 305, or 335	3	CSCI 306 or CSCI/BUSN/MATH Elective	3
CSCI Elective (upper-division)	3	CSCI 430	3
KNES 107	1	KNES Activity (see Core Curriculum)	1
Writing Competency Requirement (https://catalog.biola.edu/academic-policies/undergraduate-requirements-policies/#WritingCompetencyRequiremer			
	13		**13**

Fourth Year

Fall	Credits	Spring	Credits
HNRS 443	4	HNRS 458	4
BUSN 323	3	BBST 465	3
CSCI 402	3	CSCI 450	3
CSCI Elective (upper-division)	3	CSCI 306 or CSCI/BUSN/MATH Elective	3
Science (see Core Curriculum)	3		
	16		**13**

Total Credits 122

Note: Those that took at least 2 years of a foreign language in high school need not take a foreign language class. At most 8 credits may be obtained through KNES classes; at most 8 credits may be obtained through applied music classes.