

# COMPUTER SCIENCE B.S.

## Program Learning Outcomes

*Mission: The mission of the Computer Science program is to prepare graduates for diverse and impactful careers in technology while fostering a Christ-centered approach to leadership and service. We aim to ensure that all students, whether majors or non-majors, understand the core concepts of computer science, utilize its tools, and contribute to its future advancements.*

## Program Learning Outcomes

- 1. Technical Proficiency:** Graduates will demonstrate mastery of core computer science concepts, programming languages, and software development practices, enabling them to solve complex problems and create innovative solutions.
- 2. Problem-Solving Skills:** Students will develop strong analytical and critical thinking skills, applying them to identify, analyze, and address real-world computational challenges effectively.
- 3. Ethical and Character Development:** Graduates will exhibit ethical conduct and character in their professional and personal lives, grounded in Christian values, as they navigate the ethical dilemmas often encountered in the technology industry.
- 4. Effective Communication:** Students will effectively communicate complex technical ideas and solutions to diverse audiences, fostering collaboration and understanding in interdisciplinary settings.
- 5. Professional and Career Readiness:** Graduates will be prepared for successful careers in various computer science fields, demonstrating readiness for leadership roles, adaptability to emerging technologies, and a commitment to service-oriented leadership with a Christ-centered approach.

## Requirements

Code	Title	Units
	Core Curriculum Requirements ( <a href="https://catalog.vanguard.edu/interdisciplinary-offerings/core-curriculum/">https://catalog.vanguard.edu/interdisciplinary-offerings/core-curriculum/</a> ) <sup>1</sup>	47
	Mathematics Core Requirements	20
	Computer Science Major Requirements	53
	General Electives	0
	<b>Total Units</b>	<b>120</b>

## Mathematics Core Requirements

Code	Title	Units
<b>Lower Division:</b>		
MATH-180C	Calculus I	4
MATH-181C	Calculus II	4
MATH-265C	Intro to Statistical Methods	3
MATH-285	Introduction to Advanced Mathematics	3
<b>Upper Division:</b>		
MATH-300	Linear Algebra	3
MATH-375	Discrete Mathematics	3
	<b>Total Units</b>	<b>20</b>

## Computer Science Major Requirements

Code	Title	Units
<b>Lower Division:</b>		
CSCI-110C	Introduction to Computer Science	4
CSCI-205	Cybersecurity	3
CSCI-208	Java Programming	4
CSCI-216	Introduction to Web Programming	3
CSCI-217	Database Systems I	3
CSCI-218	Python Programming	4
<b>Upper Division:</b>		
CSCI-302	Algorithm Design and Applications	3
CSCI-305	Programming Languages	3
CSCI-317	Data Structures	4
CSCI-325	Introduction to Networks	4
CSCI-330	Introduction to Operating Systems	3
CSCI-411	Software Engineering I	3
CSCI-415	Computer Architecture	3
CSCI-425	Computing Theory	3
CSCI-499C	Computer Science Capstone	3
	<b>Elective</b>	<b>3</b>
Take 3 units from the following:		
CSCI-309	Network Security and Digital Crime	
CSCI-320	Digital Forensics and Investigation	
CSCI-450	UG Research Internship Program	
CSCI-470	Special Topic in Computer Science	
MATH-390	Numerical Analysis	
	<b>Total Units</b>	<b>53</b>

<sup>1</sup> Number of units required from the Core Curriculum not included in the major requirements below.

## Four Year Plan

**Disclaimer:** This sample Four Year Plan is provided as a guide for the recommended sequencing of courses. Vanguard University requires that students complete a minimum of 120 units of required course work as outlined on the Requirements tab in order to receive a Bachelor of Arts, Bachelor of Music, Bachelor of Science, or Bachelor of Science in Nursing degree. It is the student's responsibility to confirm with the department the course rotation before enrolling in courses. If applicable, please note the footnotes at the bottom of the page for additional information related to courses listed in a particular year and term. Questions, contact the Department of Physical Sciences and Applied Mathematics.

**Study Abroad Participation:** Students interested in participating in the university's Study Abroad programs are encouraged to reach out to the Global Education and Outreach Office ([studyabroad@vanguard.edu](mailto:studyabroad@vanguard.edu)) for more information and collaboration in their academic course planning. Students using Education and Training Benefits through the U.S. Department of Veteran Affairs are encouraged to also reach out to the School Certifying Official

([veteranscertifyingofficial@vanguard.edu](mailto:veteranscertifyingofficial@vanguard.edu)) for more information regarding how benefits can be applied.

Course	Title	Units
<b>Year 1 Term 1</b>		
CSCI-110C	Introduction to Computer Science	4
MATH-180C	Calculus 1	4
CORE-CSTN	Cornerstone	1
CORE-ENGL1	Composition Requirement	3
CORE-THEO2	NT Survey Requirement	3
<b>Units</b>		<b>15</b>
<b>Year 1 Term 2</b>		
CSCI-208	Java Programming	4
MATH-181C	Calculus II	4
CORE-ARHU1	History/Political Science Requirement	3
CORE-SCI2	Science Fitness and Wellness Requirement	3
CORE-THEO1	Theology Intro Requirement	3
<b>Units</b>		<b>17</b>
<b>Year 2 Term 1</b>		
CSCI-205	Cybersecurity	3
CSCI-218	Python Programming	4
CSCI-317	Data Structures	4
MATH-265C	Intro to Statistical Methods	3
CORE-ENGL3	Speech Composition and Presentation Requirement	3
<b>Units</b>		<b>17</b>
<b>Year 2 Term 2</b>		
CSCI-216	Introduction to Web Programming	3
CSCI-217	Database Systems 1	3
MATH-285	Introduction to Advanced Mathematics	3
CORE-SOBS1	Social/Behavioral Science Requirement 1	3
CORE-THEO3	OT Survey Requirement	3
<b>Units</b>		<b>15</b>
<b>Year 3 Term 1</b>		
MATH-300	Linear Algebra	3
MATH-375	Discrete Mathematics	3
CORE-ARHU3	Fine Arts/Philosophy Requirement	3
CORE-ENGL2	Researched Writing Requirement	3
CORE-SOBS2	Social/Behavioral Science Requirement 2	3
<b>Units</b>		<b>15</b>
<b>Year 3 Term 2</b>		
CSCI-302	Algorithm Design and Applications	3
CSCI-305	Programming Languages	3
CSCI-325	Introduction to Networks	4
CSCI-425	Computing Theory	3
CORE-THEO4	Christian Worldview Requirement	3
<b>Units</b>		<b>16</b>
<b>Year 4 Term 1</b>		
CSCI-330	Introduction to Operating Systems	3
CSCI-415	Computer Architecture	3

CSCI-ELECT	CSCI/MATH Elective	3
CORE-SCI1	Science and Lab Requirement	4
<b>Units</b>		<b>13</b>
<b>Year 4 Term 2</b>		
CSCI-411	Software Engineering 1	3
CSCI-499C	Computer Science Capstone	3
CORE-ARHU2	Literature Requirement	3
CORE-THEO5	Christian Heritage Requirement	3
<b>Units</b>		<b>12</b>
<b>Total Units</b>		<b>120</b>

