

# COMPUTER SCIENCE

## Program Description

Computer programming, algorithms, data structures, and languages play an increasingly important role in academic, science and business careers. The Associate in Science degree satisfies the transfer requirements of many disparate 4-year colleges and universities. Our up-to-date curriculum is also valuable for enhancing the career opportunities of working professionals.

Learn more about the program on the [Computer Science website](#).

## Associate Degree for Transfer

This program also offers an Associate Degree for Transfer. Learn more and review the degree requirements on the [Computer Science AS-T listing](#).

## Program Learning Outcomes

- Students will be able to use standard software engineering tools to create reusable code.
- Students will be able to design a large program that takes advantage of existing code libraries.
- Students will be able to organize a complex program in a logical way, enabling the extension of the program.
- Students will be able to comprehend user requirements and produce code and documentation in an industry-accepted style that satisfies those requirements.
- Students will be able to develop software that solves problems in a variety of fields, including math, physics, chemistry, biology, astronomy, business, and the internet.
- Students will be able to design and implement security policies for organizations of all sizes (Cybersecurity certificate).

## Career Opportunities

The local Silicon Valley industry continues to need qualified software engineers, system administrators, software quality assurance engineers and systems integrators.

## Award Type(s)

- AS = Associate in Science Degree
- CA = Certificate of Achievement

## Units Required

- Major: 56
- Certificate(s): 24-28

## Associate Degree Requirements

Code	Title	Units
<b>English Proficiency</b>		
Select one of the following:		
ENGL 1A	COMPOSITION & READING	5
ENGL 1AH	HONORS COMPOSITION & READING	5
ENGL 1S & ENGL 1T	INTEGRATED COMPOSITION & READING and INTEGRATED COMPOSITION & READING	8
or equivalent		

### Mathematics Proficiency

Select one of the following:

MATH 105	INTERMEDIATE ALGEBRA	5
MATH 180	QUANTITATIVE REASONING	5

or any MATH course approved for Foothill GE Area V, Communication & Analytical Thinking

A minimum of 90 units is required<sup>1</sup> to include:

- Completion of one of the following general education patterns: Foothill General Education, CSU General Education Breadth Requirements or the Intersegmental General Education Transfer Curriculum (IGETC)
- Core courses (38 units)
- Support courses (18 units)

<sup>1</sup> Additional elective course work may be necessary to meet the 90-unit minimum requirement for the associate degree.

**Note:** All courses pertaining to the major must be taken for a letter grade. In addition, a grade of "C" or better is required for all core and support courses used for the degree or certificates.

## Core and Support Courses

Code	Title	Units
<b>Core Courses</b>		
C S 10	COMPUTER ARCHITECTURE & ORGANIZATION	4.5
MATH 1A	CALCULUS	5
or MATH 1AH	HONORS CALCULUS I	
MATH 1B	CALCULUS	5
or MATH 1BH	HONORS CALCULUS II	
MATH 1C	CALCULUS	5
MATH 22	DISCRETE MATHEMATICS	5
or C S 18	DISCRETE MATHEMATICS	
And select one option from the following:		13.5

### Option #1: Java

C S 1A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN JAVA	
C S 1B	INTERMEDIATE SOFTWARE DESIGN IN JAVA	
C S 1C	ADVANCED DATA STRUCTURES & ALGORITHMS IN JAVA	

### Option #2: C++

C S 2A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN C++	
C S 2B	INTERMEDIATE SOFTWARE DESIGN IN C++	
C S 2C	ADVANCED DATA STRUCTURES & ALGORITHMS IN C++	

### Option #3: Python

C S 3A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN PYTHON	
C S 3B	INTERMEDIATE SOFTWARE DESIGN IN PYTHON	
C S 3C	ADVANCED DATA STRUCTURES & ALGORITHMS IN PYTHON	

### Support Courses

Select 18 units from the following:		18
BIOL 1A	PRINCIPLES OF CELL BIOLOGY	

BIOL 1B	FORM & FUNCTION IN PLANTS & ANIMALS
BIOL 1C	EVOLUTION, SYSTEMATICS & ECOLOGY
C S 1M	INTERMEDIATE ALGORITHM & DATA STRUCTURE METHODOLOGIES IN JAVA
C S 2M	INTERMEDIATE ALGORITHM & DATA STRUCTURE METHODOLOGIES IN C++
C S 3M	INTERMEDIATE ALGORITHM & DATA STRUCTURE METHODOLOGIES IN PYTHON
C S 20A	PROGRAMMING IN C#
C S 21A	PYTHON FOR PROGRAMMERS
C S 21B	INTERMEDIATE PYTHON PROGRAMMING
C S 22A	JAVASCRIPT FOR PROGRAMMERS
C S 26A	RUBY & FUNCTIONAL PROGRAMMING
C S 30A	INTRODUCTION TO LINUX
C S 30B	LINUX SHELL PROGRAMMING
C S 30C	LINUX SYSTEM ADMINISTRATION
C S 30D	ADVANCED LINUX SYSTEM ADMINISTRATION
C S 30E	LINUX SYSTEM ADMINISTRATION: NETWORK SERVICES
C S 31A	INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS
C S 40A	SOFTWARE ENGINEERING METHODOLOGIES
C S 48A	DATA VISUALIZATION
C S 49	FOUNDATIONS OF COMPUTER PROGRAMMING
C S 50A	NETWORK BASICS (CCNA)
C S 55A	INTRODUCTION TO CLOUD COMPUTING IN AMAZON WEB SERVICES
C S 55B	DATABASE ESSENTIALS IN AMAZON WEB SERVICES
C S 55C	COMPUTE ENGINES IN AMAZON WEB SERVICES
C S 55D	SECURITY IN AMAZON WEB SERVICES
C S 63A	DEVELOPING APPLICATIONS FOR IOS
C S 64A	WRITING APPS FOR THE ANDROID IN JAVA
C S 71A	DATA ANALYTICS & MANAGEMENT
C S 80A	OPEN SOURCE CONTRIBUTION
C S 81A	3-D GRAPHICS PROGRAMMING
C S 82A	INTRODUCTION TO SOFTWARE QUALITY ASSURANCE
C S 84A	DATABASE-DRIVEN WEB APPLICATION DEVELOPMENT
C S 84B	DISTRIBUTED DATABASES
CHEM 1A	GENERAL CHEMISTRY or CHEM 1AH HONORS GENERAL CHEMISTRY
CHEM 1B	GENERAL CHEMISTRY or CHEM 1BH HONORS GENERAL CHEMISTRY
CHEM 1C	GENERAL CHEMISTRY & QUALITATIVE ANALYSIS
MATH 1D	CALCULUS
MATH 2A	DIFFERENTIAL EQUATIONS
MATH 2B	LINEAR ALGEBRA
PHYS 2A	GENERAL PHYSICS
PHYS 2AM	GENERAL PHYSICS: CALCULUS SUPPLEMENT
PHYS 2B	GENERAL PHYSICS
PHYS 2BM	GENERAL PHYSICS: CALCULUS SUPPLEMENT
PHYS 2C	GENERAL PHYSICS

PHYS 2CM	GENERAL PHYSICS: CALCULUS SUPPLEMENT
PHYS 4A	GENERAL PHYSICS (CALCULUS)
PHYS 4B	GENERAL PHYSICS (CALCULUS)
PHYS 4C	GENERAL PHYSICS (CALCULUS)

**Total Units** 56

## Certificate Requirements

### Certificate of Achievement in Cloud Computing

• Units: 27

Code	Title	Units
C S 30A	INTRODUCTION TO LINUX	4.5
C S 50A	NETWORK BASICS (CCNA)	4.5
C S 55A	INTRODUCTION TO CLOUD COMPUTING IN AMAZON WEB SERVICES	4.5
C S 55B	DATABASE ESSENTIALS IN AMAZON WEB SERVICES	4.5
C S 55C	COMPUTE ENGINES IN AMAZON WEB SERVICES	4.5
C S 55D	SECURITY IN AMAZON WEB SERVICES	4.5

**Total Units** 27

### Certificate of Achievement in Cybersecurity

• Units: 27

Code	Title	Units
C S 30A	INTRODUCTION TO LINUX	4.5
C S 50A	NETWORK BASICS (CCNA)	4.5
C S 53A	CYBERSECURITY FUNDAMENTALS	4.5
C S 53B	FIREWALLS & THREAT MANAGEMENT	4.5
C S 53C	ETHICAL HACKING	4.5
C S 53D	INTRODUCTION TO COMPUTER FORENSICS	4.5

**Total Units** 27

### Certificate of Achievement in Advanced Software Development

• Units: 27-28

Code	Title	Units
C S 1A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN JAVA <sup>1</sup>	4.5
or C S 2A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN C++	
or C S 3A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN PYTHON	
C S 1B	INTERMEDIATE SOFTWARE DESIGN IN JAVA <sup>1</sup>	4.5
or C S 2B	INTERMEDIATE SOFTWARE DESIGN IN C++	
or C S 3B	INTERMEDIATE SOFTWARE DESIGN IN PYTHON	
C S 1C	ADVANCED DATA STRUCTURES & ALGORITHMS IN JAVA <sup>1</sup>	4.5
or C S 2C	ADVANCED DATA STRUCTURES & ALGORITHMS IN C++	
or C S 3C	ADVANCED DATA STRUCTURES & ALGORITHMS IN PYTHON	

And select a minimum of 13.5 units from the following: 13.5

C S 10	COMPUTER ARCHITECTURE & ORGANIZATION
C S 18	DISCRETE MATHEMATICS
or MATH 22	DISCRETE MATHEMATICS
C S 22A	JAVASCRIPT FOR PROGRAMMERS
C S 30A	INTRODUCTION TO LINUX
C S 31A	INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS
C S 40A	SOFTWARE ENGINEERING METHODOLOGIES
C S 50A	NETWORK BASICS (CCNA)
MATH 1A	CALCULUS
or MATH 1A HONORS CALCULUS I	
or MATH 10	ELEMENTARY STATISTICS

**Total Units** 27

<sup>1</sup> It is recommended that the student stick to a particular programming language throughout the sequence of A, B, and C courses (e.g., C S 1A, 1B & 1C), at least for the A & B courses.

### Certificate of Achievement in Software Development in C++

• Units: 24-28

Code	Title	Units
C S 2A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN C++	4.5
C S 2B	INTERMEDIATE SOFTWARE DESIGN IN C++	4.5
And select a minimum of 15 units from the following:		15
C S 2C	ADVANCED DATA STRUCTURES & ALGORITHMS IN C++	
C S 10	COMPUTER ARCHITECTURE & ORGANIZATION	
C S 18	DISCRETE MATHEMATICS	
or MATH 22	DISCRETE MATHEMATICS	
C S 22A	JAVASCRIPT FOR PROGRAMMERS	
C S 30A	INTRODUCTION TO LINUX	
C S 31A	INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS	
C S 40A	SOFTWARE ENGINEERING METHODOLOGIES	
C S 50A	NETWORK BASICS (CCNA)	
MATH 1A	CALCULUS	
or MATH 1A HONORS CALCULUS I		
or MATH 10	ELEMENTARY STATISTICS	

**Total Units** 24

### Certificate of Achievement in Software Development in Java

• Units: 24-28

Code	Title	Units
C S 1A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN JAVA	4.5
C S 1B	INTERMEDIATE SOFTWARE DESIGN IN JAVA	4.5
And select a minimum of 15 units from the following:		15
C S 1C	ADVANCED DATA STRUCTURES & ALGORITHMS IN JAVA	
C S 10	COMPUTER ARCHITECTURE & ORGANIZATION	

C S 18	DISCRETE MATHEMATICS
or MATH 22	DISCRETE MATHEMATICS
C S 22A	JAVASCRIPT FOR PROGRAMMERS
C S 30A	INTRODUCTION TO LINUX
C S 31A	INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS
C S 40A	SOFTWARE ENGINEERING METHODOLOGIES
C S 50A	NETWORK BASICS (CCNA)
MATH 1A	CALCULUS
or MATH 1A HONORS CALCULUS I	
or MATH 10	ELEMENTARY STATISTICS

**Total Units** 24

### Certificate of Achievement in Software Development in Python

• Units: 24-28

Code	Title	Units
C S 3A	OBJECT-ORIENTED PROGRAMMING METHODOLOGIES IN PYTHON	4.5
C S 3B	INTERMEDIATE SOFTWARE DESIGN IN PYTHON	4.5
And select a minimum of 15 units from the following:		15
C S 3C	ADVANCED DATA STRUCTURES & ALGORITHMS IN PYTHON	
C S 10	COMPUTER ARCHITECTURE & ORGANIZATION	
C S 18	DISCRETE MATHEMATICS	
or MATH 22	DISCRETE MATHEMATICS	
C S 22A	JAVASCRIPT FOR PROGRAMMERS	
C S 30A	INTRODUCTION TO LINUX	
C S 31A	INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS	
C S 40A	SOFTWARE ENGINEERING METHODOLOGIES	
C S 50A	NETWORK BASICS (CCNA)	
MATH 1A	CALCULUS	
or MATH 1A HONORS CALCULUS I		
or MATH 10	ELEMENTARY STATISTICS	

**Total Units** 24