# Certificate: Programming Fundamentals
# 24-25

**ABOUT THIS CERTIFICATE:**

A student completing the Programming Fundamentals Certificate will gain a solid grounding in the basic principles that underlie Computer Science. This certificate provides both academic preparation for and a pathway to internships. When combined with further study, it will lead to the Computer Science Associate in Science for Transfer (AS-T), and/or transfer. This certificate is intended to be completed at the beginning of a student's course of study, while they are at the freshman level. For more information, visit the Mathematics, Sciences, and Engineering division.

**TO EARN A Certificate A STUDENT MUST COMPLETE THE FOLLOWING:**

[1] Completion of Major & Program Electives Courses
[2] Minimum grade point average of 2.0
[3] A C or better in all courses required for the major

**Residency:** Minimum of 12 units completed at AVC with a minimum of 9 of those units completed from the certificate/major. (credit earned by examination will not be included in these 12 units) Title 5, Section 54000: http://ccr.oal.ca.gov.

### Certificate- Programming Fundamentals [Total Units 15]

| Required Courses (9 units) | |
|---|---|
| MATH150 - Calculus and Analytic Geometry | 5 |
| PHYS110 - General Physics | 4 |

| Programming Language Options; Select One Grouping (6 units) | |
|---|---|
| **C/C++ Programming:**<br>CS 120 – programming and Algorithms in<br>CS 130- Data Structures using C/C++ | 6 |
| OR | |
| **Java Programming:**<br>CS 121 Programming and Algorithms in Java<br>CS 131-Data Structures using Java | 6 |
| OR | |
| **Python Programming:**<br>CS 122- Programming and Algorithms in Python<br>CS132- Data Structures using Python | 6 |

**RECOMMENDED PATHWAY Certificate-** Programming Fundamentals

The Recommended Plan of Study is determined by the discipline faculty.

- Take classes in **Summer** or **Intersession** if needed to complete your degree in a timely manner.
- Fall/Spring: Max 19 units, 12-15 units Recommended.
- This is a certificate only program, currently no associated degree offered.

| TERM 1 | |
|---|---|
| **Course** | **Units** |
| Programming Language:CS 120 or CS 121 or CS 122 | 3 |
| **MATH 150** | 5 |
| Total Units | 8 |

| TERM 2 | |
|---|---|
| **Course** | **Units** |
| Programming Language:CS 130 or CS 131 or CS 132 | 3 |
| **PHYS 110** | 4 |
| Total Units | 7 |

### COUNSELING NOTE SECTION

**Prerequisite:** If a course is listed as a prerequisite for another course, that prerequisite course must be completed with a satisfactory grade to enroll in the next course. A satisfactory grade is a grade of "A," "B," "C" or "P".

Students who enroll in classes for which they do not meet the prerequisites will be involuntarily dropped. Students will be notified of this involuntary drop. Title 5, Section 55200(d)

**INFORMATION and RESOURCES**

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|---|---|---|
| Tutoring Assistance | Career Center | AVC Student Health Services |
| Transfer Center | Office of Students with Disabilities | Palmdale Center |
| Basic Needs | Financial Aid | Counseling Division |

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