

# COMPUTER PROGRAMMING

## Post-Graduate Certificate Program

UC SANTA CRUZ SILICON VALLEY CAMPUS  
**UCSC** Silicon Valley  
Extension

in partnership with  Higher Education

UCSC Silicon Valley Extension's Certificate in Computer Programming can help you build a strong foundation in software development and apply coding skills across a wide range of platforms, from computers and mobile devices, to Web development and the cloud. This certificate covers all major programming languages used in the industry. Each language has its own application environment. We offer two levels of courses to suit students with different backgrounds and needs.

### Who Should Attend?

- Software developers who want to enhance their programming knowledge
- Professionals in the field who want to keep up with rapid industry changes
- Graduating students or career changes looking to enter the software field
- Engineers that need programming training for their projects

### Curriculum

#### Certificate | 2 Quarters | 14.5 Units

##### **C Programming for Beginners | 3 Units**

Begin with an overview of programming and tools. It introduces functions, data types, input/output, strings, operators, precedence, and expressions. Demonstrate the use of control statements, arrays, and pointers for problem solving. Write non-trivial programs and learn to create modular programs with efficiency and readability. **Skills needed:** Technical aptitude and experience with computer operating system or equivalent knowledge.

##### **Java Programming, Comprehensive | 3 Units**

Covers the Java fundamentals, including language syntax, constructs, and the development environment. It extends to the Java platform, including client/server communication and managing XML data. Begin with Java's implementation of object-oriented concepts. Additional topics include the Java class library, collection frameworks, Internet communication, and multithreaded programming. **Skills needed:** Java Programming for Beginners is recommended for those new to Java. Experience in a programming language such as C or C++ may also help with learning Java.

##### **Java Programming for Beginners | 2 Units**

The instructor introduces basic and intermediate Java syntax, and then addresses abstraction, object-oriented paradigm, procedural programming, elementary data structures, and more. Other useful topics include graphics user interface, collections and generics. Gain a strong conceptual foundation in these areas while starting to write programs for real applications. **Skills needed:** Student should have experience using logic. Some programming experience will be helpful. Ability to install and configure open-source software on own computers.

##### **Perl Programming | 2 Units**

Comprehensive hands-on course covers all basic Perl syntax and programming constructs. Develop programs in class and as homework assignments. Covers file handle, filters, testing and system interface, introduces the object-oriented features, standard libraries, and how to package and modularize Perl programs. By the end of course, you will be able to develop sophisticated Perl scripts in several applications. **Skills needed:** recent programming experience in any language is required.

##### **C++ Programming, Comprehensive | 3 Units**

C++ is a general-purpose object-oriented programming language that offers portability, speed, and modularity, as well as compatibility with C and other languages. Topics include object-oriented concepts; structure and input/output streams; declarations, identifiers, pointers, and arguments; memory management, constructors, and destructors. **Skills needed:** Experience with high level programming language such as C.

##### **Python Programming, Beginners | 1.5 Units**

Hands-on lab-based course covers the important concepts and programming mechanisms that exist in all languages: reading and writing to standard I/O, using operators, controlling flow of execution, using functions, reading and writing files, and object-oriented programming concepts, etc. It also includes specific facilities such as code re-use, built-in sequence types and iteration. **Skills needed:** N/A - Course may be at a slow pace for those familiar with programming language.



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### *Additional Curriculum*

#### **Certificate & OPT | 3 Quarters | 29.5 Units**

##### **C Programming, Advanced | 3 Units**

This course will introduce sophisticated problem-solving techniques. Solidify your understanding of strings, arrays, structures, unions and bit manipulation. Emphasis will be on programming that employs and improves upon a variety of data structures. Learn to write efficient programs by understanding complexities of various algorithms. **Skills needed:** Students should have a good understanding of programming using data types such as pointers, control flow, structures and functions.

##### **Python for Programmers | 3 Units**

Lab-based course builds proficiency and the skills and knowledge for creating applications using task-specific Python libraries. Topics include the Python environment and code introspection, syntax, flow control, function protocols, exception handling and functional programming. Learn about object-oriented features, classes, inheritance and overriding as well as building applications, packages, and libraries. **Skills needed:** Significant experience in any programming language.

##### **Developing Applications for Android Mobile Devices Intro | 2 Units**

In this course you will learn from a simple application that demonstrates how to build applications for the new platform. You will complete programming assignments to learn how to program the platform with Java code, debug it, implement the UI, and use optional APIs and Google libraries to enrich the application. **Skills needed:** Java programming experience is required to program Android.

##### **Developing Applications for Android Mobile Devices, Advanced | 2 Units**

Learn the advanced capabilities by going beyond the basics and cover key topics such as creating custom views, web views, drawables, widgets, camera applications, and SMS. Learn many recipes for popular tasks that developers are likely to come across. Offers a balance of technical topics and practical recipes, that will efficiently prepare you to tackle real-world development projects. **Skills needed:** Java programming experience is required to program Android. Students should have some experience developing Android apps. Basic knowledge (at the level of “Developing Applications for Android Mobile Devices” course #21956) will not be repeated here.

##### **Developing Applications for iPhone and iPad, Introduction | 2 Units**

Provides a hands-on approach introducing the iOS software development kit (SDK) to develop iPhone/iPad applications and discusses Xcode, Cocoa Touch Frameworks, Objective-C and Swift programming languages. Learn how to customize iOS user interfaces using Libraries and Inspectors, build scenes within storyboard, integrate iOS frameworks, and understand MVC Architecture. **Skills needed:** Students should have some programming experience with a computer programming language.

##### **Developing Applications for iPhone and iPad, Advanced | 3 Units**

Gain the knowledge you need to design and develop advanced applications for the iOS operating system. Focus on five areas of iOS development: user interface, threading and multitasking, “simple” mobile backend-as-a-service to support an iOS application, accessing iOS features and hardware, and various iOS/XCode development and debugging tools. **Skills needed:** Familiarity with the XCode, iOS SDK, Objective C, and/or Swift language, and application development process. Lessons do not repeat the basics.

##### **Internships (unpaid) | 3 Units Minimum 90 Hours Per Quarter**

Enrolling in a certificate program allows you to participate in multiple unpaid internships at local companies in your field of study. Internships are available across a variety of sectors, generally at mid-sized companies, such as Agylytyx, Crowdera Inc, Innowest, and YMedia Labs. Good internships are much sought after and highly competitive. To stand the best chance of securing your preferred placement, our Internship Coordinators are on hand with expert support and guidance.