

# COMPUTER SCIENCE

School of Mathematics, Computer Science and Engineering

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## Curriculum

The Computer Science Department in the School of Mathematics, Computer Science and Engineering conducts a program designed for students who are developing computer programming skills in preparation for professional careers and/or transfer to a four-year college or university. Courses are intended to meet the needs of students at various levels of competence, from the novice to the expert. The department acquaints students with the presently available methods of computer science that are useful in solving problems of science, industry, and government; prepares students for the additional formal education and self-education required in this ever-developing field; and fosters students' abilities to solve computer science problems.

## Major

Students may take individual courses to gain expertise in specific areas, or they may take courses collectively to earn the Associate in Science degree or Certificate of Achievement in computer science with an emphasis in computer languages. The major introduces a variety of programming languages and each language's many applications.

## Career Options

Examples of careers for the computer science major include the following:

- Database Administrator
- Programmer
- Software Engineer
- Systems Analyst
- Web Development

## Associate Degree

### Associate in Science Degree in Computer Science

#### Emphasis: Computer Languages

Students must complete a minimum of 60 units of credit, including the courses in the major ("Major Requirements") and general education requirements (pages 43-49), with an overall GPA of 2.0 or better, and a grade of "A," "B," "C," or "P" in all courses to be counted toward the major. A minimum of 12 units must be completed at Irvine Valley College. See pages 34-35 for further information.

## Certificate Program

### Certificate of Achievement: Computer Science

#### Emphasis: Computer Languages

Students must complete all courses in the certificate program ("Major Requirements") with a grade of "A," "B," "C," or "P." A minimum of 12 units in the certificate program must be completed at Irvine Valley College. See page 31 for further information.

## Transfer Preparation

Courses that fulfill major requirements for an associate degree at Irvine Valley College may not be the same as those required for completing the major at a transfer institution offering a bachelor's degree. Students who plan to transfer to a four-year college or university should schedule an appointment with an IVC counselor to develop a plan of study before beginning their program. It may be helpful to meet with the department faculty at IVC.

### Associate in Science Degree or Certificate of Achievement Major Requirements: COMPUTER SCIENCE

#### COMPUTER LANGUAGES EMPHASIS

<b>Complete the following course:</b>		<b>Units</b>
<b>CS 1</b>	Introduction to Computer Systems	4
<b>Complete any <u>four</u> of the following courses:</b>		
<b>CS 6A</b>	Computer Discrete Mathematics I	3
<b>CS 6B</b>	Computer Discrete Mathematics II	3
<b>CS 36</b>	C Programming	4
<b>CS 37</b>	C++ Programming	4
<b>CS 38</b>	World Wide Web/Intranet Using Java Programming	4
<b>CS 50A</b>	HTML Programming	4
<b>CS 130</b>	Visual Basic Programming	4
<b>CS 131</b>	Database Management Programming	4
<b>Complete any <u>two</u> of the following courses:</b>		
<b>CS 39</b>	C# Programming Using Microsoft .Net	4
<b>CS 40A</b>	Computer Organization and Assembly Language I	4
<b>CS 40B</b>	Computer Organization and Assembly Language II	4
<b>CS 41</b>	Data Structures	4
<b>CS 230</b>	Advanced Visual Basic Programming	3.5
<b>TOTAL UNITS:</b>		<b>25.5-28</b>

## COURSES

### CS 1: INTRODUCTION TO COMPUTER SYSTEMS

4 Units

3 hours lecture, 3 hours lab

Transfers: CSU, UC

This course provides an overview of computer information systems and introduces hardware, software, networking, and Internet terminology. The course introduces Windows and Microsoft Office software, focusing particularly on spreadsheet and database applications. It also introduces programming languages and engages students in writing and executing elementary programs in Visual Basic. NR

### CS 6A: COMPUTER DISCRETE MATHEMATICS I

3 Units

3 hours lecture

Transfers: CSU, UC

Prerequisite: Math 2

*Recommended Preparation: Concurrent enrollment in Tu. 301 is strongly recommended*

This course is designed primarily for computer science majors. Areas of study include Boolean algebra, propositional calculus, and predicate calculus. Topics include truth tables, minimization, sets, relations, switching networks, digital circuits, and duality. This course is also listed as Math 30; credit will be given in either area, not both. NR

### CS 6B: COMPUTER DISCRETE MATHEMATICS II

3 Units

3 hours lecture

Transfers: CSU, UC

Prerequisite: Math 2

*Recommended Preparation: Concurrent enrollment in Tu. 301 is strongly recommended*

This course is designed primarily for computer science majors. Areas of study include permutations, combinations, binomial coefficients, recurrence relations, graph theory, generating functions, and probability theory. This course is also listed as Math 31; credit will be given in either area, not both. NR

### CS 36: C PROGRAMMING

4 Units

3 hours lecture, 3 hours lab

Transfers: CSU, UC

*Recommended Preparation: Some programming experience would be helpful.*

This course introduces the C programming language. Topics include data types, control structures, functions and parameter passing, loops, arrays, structures, text and binary files, recursion, and pointers. Students will exercise problem-solving skills in a wide range of applications as they analyze problems, develop algorithms, design and implement programs, and resolve program errors. NR

### CS 37: C++ PROGRAMMING

4 Units

3 hours lecture, 3 hours lab

Transfers: CSU, UC

Prerequisite: CS 36

This course introduces the C++ programming language. Topics include input and output statements, file handling, functions and parameter passing, function pointers, overloading functions, templates, pointers including the "this" pointer, object-oriented programming principles, classes, constructors and destructors, friends, operator overloading, inheritance, polymorphism, and exception handling. NR

### CS 38: WORLD WIDE WEB/INTERNET USING JAVA PROGRAMMING

4 Units

3 hours lecture, 3 hours lab

Transfers: CSU, UC

*Recommended Preparation: CS 36 or 37*

This course focuses on application development using Java. The course covers Java syntax and operating procedures, as well as design and programming techniques for object-oriented programs. Additional topics include Applet programming in Java, fonts, colors, multithreading, streams, and native methods and libraries. NR

### CS 39: C# PROGRAMMING USING MICROSOFT.NET

4 Units

3 hours lecture, 3 hours lab

Transfers: CSU, UC

*Recommended Preparation: CS 37 and CS 38*

In this course, students will use the C# programming language to create Windows, web, and database applications. Topics include C# fundamentals, object-oriented programming, strings, graphics, graphical-user-interface (GUI) components, exception handling, multithreading, multimedia, file processing, prepackaged data structures, and database processing. NR

### CS 40A: COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE I

4 Units

3 hours lecture, 3 hours lab

Transfers: CSU, UC

Prerequisite: CS 36, 37 or 38

This course introduces computer organization focusing especially on assembly language programming. Topics include finite-precision arithmetic, floating-point architecture, and Boolean algebra. The course also discusses conventional machine language and its corresponding assembly language notation. NR

### CS 40B: COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE II

4 Units

3 hours lecture, 3 hours lab

Transfers: CSU, UC

Prerequisite: CS 40A

This course is a continuation of Computer Science 40A. Students will further study computer organization and assembly language and the differences among assembly languages from one family of computers to another. The course will also examine microprogramming, operating systems, and multilevel machines. NR

**CS 41: DATA STRUCTURES****4 Units****3 hours lecture, 3 hours lab****Transfers: CSU, UC****Prerequisite: CS 36, 37 or 38**

This course examines the basic concepts of data structures and related algorithms. Students use arrays, structures, stacks, queues, linked lists, trees, graphs, and tables to design algorithms and then write complete programs to implement these algorithms. Recursion, searching, sorting, and timing and space analyses for algorithms will also be discussed. NR

**CS 50A: HTML PROGRAMMING****4 Units****3 hours lecture, 3 hours lab****Transfers: CSU, UC**

This course focuses on developing World Wide Web pages for the Internet using hypertext markup language (HTML). The course investigates the structure of the web, the fundamentals of writing HTML code, and the creation of a web site. Topics include creating hypertext links, working with design elements, creating and controlling text and graphic tables, using frames, building web page forms, and working with Common Gateway Interface (CGI) scripts. NR

**CS 130: VISUAL BASIC PROGRAMMING****4 Units****3 hours lecture, 3 hours lab****Transfers: CSU**

This course focuses on the development of applications using Visual Basic. The course covers Visual Basic syntax and operating procedures, as well as design and programming techniques for event-driven and object-oriented programs in Visual Basic. NR

**CS 131: DATABASE MANAGEMENT PROGRAMMING****4 Units****3 hours lecture, 3 hours lab****Transfers: CSU**

This course focuses on the principles of relational database design, programming and implementation. Topics covered include Database Concepts, Modeling, Design, and Standard Query Language (SQL); transaction management; concurrency control; client/server systems; data warehousing; and databases and the Internet. NR

**CS 230: ADVANCED VISUAL BASIC PROGRAMMING****3.5 Units****3 hours lecture, 1.5 hours lab***Recommended Preparation: CS 130*

This course focuses on application development using the advanced features of Visual Basic. Topics include database manipulation, the data control, the JET engine, Structured Query Language (SQL), Crystal Reports, objects and classes, ActiveX components. NR

**COMPUTER SCIENCE (SPECIAL SERVICES)****CISS 320: ADAPTIVE COMPUTER ASSESSMENT****1.5 Units****1.5 hours lecture**

This course is designed to provide physically limited students an overview of adaptive computer devices and to assess each student's individual needs. Appropriate modifications will be made to accommodate disabled students in computer courses. R-E-1