

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. Students seeking to develop programming skills may pursue either the computer languages emphasis, which introduces a variety of programming languages and each language's many applications; the business programming emphasis,

which concentrates on programming for business applications; or the systems analysis emphasis, which explores the structured design and implementation of software systems. Students seeking immediate workplace competencies also have the option of completing the Certificate of Competency in database.

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**

Emphases:

- Business Programming
- Computer Languages
- Systems Analysis

Students must complete a minimum of 60 units of credit, including the courses in the major ("Major Requirements") and general education requirements (pages 36-43), with an overall GPA of 2.0 or better. A minimum of 12 units must be completed at Irvine Valley College. See pages 32-35 for further information.

CERTIFICATE

- **Certificate of Achievement in Computer Science**

Emphases:

- Computer Languages
- Systems Analysis

- **Certificate of Competency in Database**

Students must complete all courses in the certificate program ("Major Requirements") with a grade of "C" or better. A minimum of 12 units in the certificate program must be completed at Irvine Valley College. See page 33 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 baccalaureate degree. Students who plan to transfer to a four-year college or university should (1) refer to the University Studies major (page 231) and "Transfer Planning" (page 47); (2) consult the catalog of their prospective transfer institution (see the IVC Transfer Center for assistance); and (3) 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.

BUSINESS PROGRAMMING EMPHASIS

MAJOR REQUIREMENTS: COMPUTER SCIENCE

Associate in Science Degree

Complete the following courses:

		Units
CS 1	Introduction to Computer Systems	4
CS 21	Introduction to Software Engineering	4
CS 30	BASIC Programming	4
CS 50A	HTML Programming	4
CS 101	Introduction to Microcomputer Applications	4
CS 130	Visual Basic Programming	4
CS 230	Advanced Visual Basic Programming	3.5

TOTAL UNITS: 27.5

COMPUTER LANGUAGES EMPHASIS**MAJOR REQUIREMENTS: COMPUTER SCIENCE****Associate in Science Degree or Certificate of Achievement**

Complete the following course:		Units
CS 1	Introduction to Computer Systems	4
Complete any four of the following courses:		
CS 30	BASIC Programming	4
CS 34	Pascal Programming	4
CS 36	C Programming	4
CS 37	C++ Programming	4
CS 40A	Computer Organization and Assembly Language I	4
CS 130	Visual Basic Programming	4
Complete any two of the following courses:		
CS 38	World Wide Web/Internet Using Java Programming	4
CS 39	C# Programming Using Microsoft.Net	4
CS 41	Data Structures	4
CS 230	Advanced Visual Basic Programming	3.5
CS 238	Advanced Java Programming	3.5
TOTAL UNITS:		27-28

SYSTEMS ANALYSIS EMPHASIS**MAJOR REQUIREMENTS: COMPUTER SCIENCE****Associate in Science Degree or Certificate of Achievement**

Complete the following courses:		Units
CS 1	Introduction to Computer Systems	4
CS 21	Introduction to Software Engineering	4
Complete any five of the following courses:		
CS 30	BASIC Programming	4
CS 34	Pascal Programming	4
CS 36	C Programming	4
CS 37	C++ Programming	4
CS 38	World Wide Web/Internet Using Java Programming	4
CS 39	C# Programming Using Microsoft.Net	4
CS 41	Data Structures	4
CS 130	Visual Basic Programming	4
CS 230	Advanced Visual Basic Programming	3.5
CS 238	Advanced Java Programming	3.5
TOTAL UNITS:		27-28

CERTIFICATE OF COMPETENCY: DATABASE

Complete the following courses:		Units
CS 131	Database Management Programming	4
CS 250A	Oracle Programming I	3.5
CS 250B	Oracle Programming II	3.5
Complete one of the following courses:		
CS 38	World Wide Web/Internet Using Java Programming	4
CS 39	C# Programming Using Microsoft.Net	4
CS 130	Visual Basic Programming	4
CS 230	Advanced Visual Basic Programming	3.5
TOTAL UNITS:		14.5-15

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 Math 180 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 Math 180 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 21: INTRODUCTION TO SOFTWARE ENGINEERING**4 Units****3 hours lecture, 3 hours lab****Transfers:** CSU, UC**Prerequisite:** CS 34, 36, 37 or 38

This course covers the specification, design, implementation, testing, and documentation of a software system. The course stresses the role of effective oral and written communication of concepts, proper programming style, well-planned testing, and group cooperation in creating a successful system. NR

CS 30: BASIC PROGRAMMING**4 Units****3 hours lecture, 3 hours lab****Transfers:** CSU, UC

This beginning-level course in computer programming introduces fundamental programming concepts and skills using the BASIC programming language. 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 34: PASCAL PROGRAMMING**4 Units****3 hours lecture, 3 hours lab****Transfers:** CSU, UC

Recommended Preparation: Some programming experience would be helpful. This course introduces the Pascal programming language. Topics include data types, control structures, procedures, functions and parameter passing, loops, arrays, records, text and binary files, recursion, pointers, and an introduction to object-oriented programming. 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 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 34, 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:** CIS 34, 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**Recommended Preparation:** CS 101

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 50B: DYNAMIC HTML PROGRAMMING AND SCRIPTING**4 Units****3 hours lecture, 3 hours lab****Transfers:** CSU**Recommended Preparation:** CS 50A

This course focuses on developing, modifying, and documenting dynamic web pages. The course reviews HTML and introduces a variety of Internet tools and scripting languages, including, but not limited to CSS (Cascading Style Sheets), JavaScript, Dynamic HTML, XHTML, and VBScript (Visual Basic Scripting), and an introduction to XML (Extensible Markup Language). No UC credit. NR

CS 101: INTRODUCTION TO MICROCOMPUTER APPLICATIONS**4 Units****3 hours lecture, 3 hours lab****Transfers:** CSU

This course introduces the purpose, uses, characteristics, capabilities, and operations of microcomputer application packages. The course uses a case-based approach to present word processing, spreadsheet, database, presentation graphics, communications, and financial software. Students will create web pages using various applications and upload work to a web server. NR

CS 130: VISUAL BASIC PROGRAMMING**4 Units****3 hours lecture, 3 hours lab****Transfers:** CSU**Recommended Preparation:** CS 30

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 142: UNIX OPERATING SYSTEM**4 Units****3 hours lecture, 3 hours lab****Transfers:** CSU

This course covers the UNIX operating system and its uses and capabilities. Students will program computer functions and perform a variety of computer operations in the UNIX environment. Computer Science 142 was formerly Computer Science 60. 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

CS 238: ADVANCED JAVA PROGRAMMING**3.5 Units****3 hours lecture, 1.5 hours lab****Prerequisite:** CS 38

This course is for programmers and developers who are already familiar with the basic structure and syntax of the Java programming language, and who have a need to acquire advanced proficiency in developing complex, production-level applications using Java. This course covers features such as multithreading, streams, files, data structures, networking, database connectivity, remote objects, GUI components, and event handling. NR

CS 250A: ORACLE PROGRAMMING I 3.5 UNITS**3 hours lecture, 1.5 hours lab****Recommended Preparation:** CS 1

This course covers the Oracle client/server database development environment. The course presents several Oracle utilities, including SQL Plus, Query Builder, and Procedure Builder, as well as the SQL and PL/SQL programming languages. NR

CS 250B: ORACLE PROGRAMMING II 3.5 Units**3 hours lecture, 1.5 hours lab****Prerequisite:** CS 250A

This course covers the use of Oracle Developer Forms and Oracle Reports to build interactive GUI (Graphical User Interface) applications. Topics include user input items; using wizards and the Object Navigator; employing blocks, triggers, reusable objects and codes; creating report templates; and embedding charts in reports. 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