

Computer Science

School of Mathematics, Computer Science and Engineering

Dean: Ruth Jacobson

Academic Chair: Mas Hayashi

Faculty: Dr. Howard Dachslager, Seth Hochwald, Dr. Jack Huang, Bill Lyon, Shawn Mesri, Mike Mukund, Al Murtz, Dr. Bao Nguyen, Robert Papendick, Dr. Nancy Reynolds

Curriculum

The Computer Information 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 in Computer Information Science with a concentration in any one of three different areas. 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 15-unit Certificate of Competency in Database.

Certificate in Computer Information Science

Students must complete all courses in the certificate program 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 60 for further information.

"**Certificates of Competency**" are granted for the completion of a specified program, or specified courses, whose total unit requirement is less than 18. These locally approved certificates are designed to acknowledge basic workplace competencies and job readiness for students who are entering the workforce or upgrading their job skills.

Associate in Science Degree in Computer Information Science

Students must complete a minimum of 60 units of credit, including the courses in the major and general education requirements (page 57), with an overall GPA of 2.0 or better. A minimum of 12 units must be completed at Irvine Valley College. See pages 54–55 for further information, including other options for fulfilling the major requirement.

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 transfer section of this catalog, (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.

Associate in Science Degree Major or Certificate in Computer Information Science

BUSINESS PROGRAMMING EMPHASIS

Complete the following courses:

	Units
CIS 1 Introduction to Computer Information Systems	3
CIS 101 Introduction to Microcomputer Applications	3
CIS 21 Introduction to Software Engineering	3
CIS 30A BASIC Programming	3
CIS 30B Advanced BASIC	3
CIS 32A Beginning COBOL Programming	3
CIS 50A HTML Programming	3
CIS 130 Visual Basic Programming	3

TOTAL UNITS: 24

(Majors continue, next page)

COMPUTER LANGUAGES EMPHASIS

Complete the following core courses:

		Units
CIS 1	Introduction to Computer Information Systems	3
CIS 101	Introduction to Microcomputer Applications	3

Choose any four of the following courses:

CIS 30A	BASIC Programming	3
CIS 32A	Beginning COBOL Programming	3
CIS 34	Pascal Programming	3
CIS 36	C Programming	3
CIS 37	C++ Programming	3
CIS 40A	Computer Organization and Assembly Language I	3
CIS 50A	HTML Programming	3
CIS 130	Visual Basic Programming	3

Choose any three of the following courses:

CIS 30B	Advanced BASIC Programming	3
CIS 32B	Intermediate COBOL Programming	3
CIS 38	World Wide Web/Internet Using Java Programming	3
CIS 41	Data Structures	3
CIS 230	Advanced Visual Basic Programming	3

TOTAL UNITS: 27

SYSTEMS ANALYSIS EMPHASIS

Complete the following core courses:

		Units
CIS 1	Introduction to Computer Information Systems	3
CIS 21	Introduction to Software Engineering	3
CIS 101	Introduction to Microcomputer Applications	3

Choose any five of the following courses:

CIS 30A	BASIC Programming	3
CIS 32A	Beginning COBOL Programming	3
CIS 34	Pascal Programming	3
CIS 36	C Programming	3
CIS 37	C++ Programming	3
CIS 41	Data Structures	3
CIS 38	World Wide Web/Internet Using Java Programming	3
CIS 130	Visual Basic Programming	3
CIS 230	Advanced Visual Basic Programming	3

TOTAL UNITS: 24

Certificate of Competency in Database

Complete the following core courses:

		Units
CIS 131	Database Management Programming	3
CIS 250A	Oracle I Programming	3
CIS 250B	Oracle II Programming	3

Choose any two of the following courses:

CIS 30B	Advanced BASIC	3
CIS 38	World Wide Web/Internet Using Java Programming	3
CIS 130	Visual Basic Programming	3
CIS 231	VBA Programming	3
CIS 230	Advanced Visual Basic Programming	3

TOTAL UNITS: 15

Courses

CIS 1: Introduction to Computer Systems

3 Units

3 hours lecture

Corequisite: CIS 50L.

This course provides an overview of computer information systems and introduces computer hardware, software and applications, as well as career opportunities in the industry. Students will write and execute elementary programs in the BASIC programming language. Students are also provided hands-on experience using DOS and spreadsheet, database, word processing, and graphics applications software. This course is designed to meet the requirements of the Data Processing Management Association (DPMA) Model Curriculum. NR

CIS 6A: Computer Mathematics I

3 Units

3 hours lecture

Prerequisite: Math 2. Recommended Preparation: Concurrent enrollment in Math 180.

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

CIS 6B: Computer Mathematics II

3 Units

3 hours lecture

Prerequisite: Math 2. Recommended Preparation: Concurrent enrollment in Math 180.

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

CIS 21: Introduction to Software Engineering

3 Units

3 hours lecture

Prerequisite: Two previous computer programming courses. Corequisite: CIS 50L.

This course covers the specification, design, implementation, testing and documentation of a software system. The methods used to create the software system will include effective oral and written communication of concepts, proper programming style, well-planned testing, and group cooperation. NR

CIS 30A: BASIC Programming

3 Units

3 hours lecture

Corequisite: CIS 50L. Recommended Preparation: CIS 1.

This is a beginning course in computer programming which 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 programs, and resolve program errors. NR

CIS 30B: Advanced BASIC Programming

3 Units

3 hours lecture

Prerequisite: CIS 30A. Corequisite: CIS 50L.

This course extends the BASIC language syntax learned in Computer Information Science 30A, with emphasis on the design structure and style of BASIC programs in business and science. The course covers algorithms; structured programming; advanced array manipulation, including sorting and searching; and sequential and random access file processing techniques. NR

CIS 32A: Beginning COBOL Programming

3 Units

3 hours lecture

Prerequisite: CIS 1. Corequisite: CIS 50L. Recommended Preparation: CIM 100A.

This course provides an introduction to COBOL programming in a business environment. Emphasis is placed on implementation and documentation of common business-oriented applications. The syntax of the COBOL language is taught with emphasis on the four divisions of COBOL, COBOL verbs, clauses, and phrases. This course is designed to meet requirements of the Data Processing Management Association (DPMA) Model Curriculum. NR

CIS 32B: Intermediate COBOL Programming **3 Units**
3 hours lecture

Prerequisite: CIS 32A. *Corequisite:* CIS 50L.

This course is a continuation of Computer Information Science 32A. The course focuses on structured procedures for designing programs. Students will develop, test, implement, and document programs for common business applications using the COBOL programming language. The course will cover sequential and random access files and processing techniques, as well as techniques for developing programs and systems of programs for batch and interactive environments. This course is designed to meet the requirements of the Data Processing Management Association (DPMA) Model Curriculum. NR

CIS 34: Pascal Programming **3 Units**
3 hours lecture

Corequisite: CIS 50L. *Recommended Preparation:* CIS 30A.

This course covers computer programming, including design procedures, and applies Pascal, a procedure-oriented language, to solutions of a wide variety of problems relating to business and science. Emphasis is placed on the development, debugging, and testing of procedure-oriented programs that use scalar, structured, and dynamic data types including arrays, files, records, and pointers. Both recursive and non-recursive procedures and functions will be used in the solution of problems. The course includes an introduction to software engineering and object-oriented programming. Students implement abstract data types and units. NR

CIS 36: C Programming **3 Units**
3 hours lecture

Prerequisite: CIS 34 or 40A. *Corequisite:* CIS 50L.

This course introduces the C programming language. Topics include lexical conventions, data types, control structures, functions, pointers, records, structures, input/output, and operating system interfaces. NR

CIS 37: C++ Programming **3 Units**
3 hours lecture

Prerequisite: CIS 36. *Corequisite:* CIS 50L.

This course introduces the C++ programming language. Topics include lexical conventions, data types, functions, control structures, overloading, classes, and object-oriented programming. NR

CIS 38: World Wide Web/Internet Using JAVA Programming **3 Units**
3 hours lecture

Corequisite: CIS 50L. *Recommended Preparation:* CIS 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. Formerly CIS 55B. NR

CIS 40A: Computer Organization and Assembly Language I **3 Units**
3 hours lecture

Prerequisite: Any two programming language courses. *Corequisite:* CIS 50L.

Recommended Preparation: Math 253.

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

CIS 40B: Computer Organization and Assembly Language II **3 Units**
3 hours lecture

Prerequisite: CIS 40A. *Corequisite:* CIS 50L.

This course is a continuation of Computer Information 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

CIS 41: Data Structures **3 Units**
3 hours lecture

Prerequisite: One year of programming and Math 253. *Corequisite:* CIS 50L.

This course examines the basic concepts of data structures and related algorithms. Students will use stacks, queues, trees, graphs, and strings to design algorithms and then write complete programs using a programming language such as Pascal, C, or C++ to implement these algorithms. Recursion, searching, sorting, and a timing and space analysis for algorithms will also be discussed. NR

CIS 50A: HTML Programming **3 Units**
3 hours lecture

Corequisite: CIS 50L. *Recommended Preparation:* CIS 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. Formerly CIS 55A. NR

CIS 50B: Dynamic HTML Programming and Scripting **3 Units**
3 hours lecture

Corequisite: CIS 50L. *Recommended Preparation:* CIS 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). UC credit pending. NR

CIS 101: Introduction to Microcomputer Applications **3 Units**
3 hours lecture

Corequisite: CIS 100L.

This course introduces students to the uses, characteristics, capabilities, and operation of microcomputer application software. The course covers basic concepts and vocabulary common to application packages. Concurrent lab work using generic software will familiarize the student with word processing, spreadsheet, database management, graphics, communication, and financial packages. This course will prepare the student for more detailed courses in application software. NR

CIS 130: Visual Basic Programming **3 Units**
3 hours lecture

Prerequisite: CIS 30A. *Corequisite:* CIS 100L.

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. Additional topics include error handling, graphics, adding colors, adding icons, accessing databases, linking applications using Dynamic Data Exchange (DDE), and Object Linking and Embedding (OLE). NR

CIS 131: Database Management Programming **3 Units**
3 hours lecture

Corequisite: CIS 100L.

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

CIS 142: UNIX Operating System **3 Units**
3 hours lecture

Corequisite: CIS 100L. *Recommended Preparation:* CIM 104.1A.

This course covers the UNIX operating system, its uses and capabilities. Students will perform a variety of computer operations using the UNIX system. NR

CIS 230: Advanced Visual Basic Programming **3 Units**

3 hours lecture

Corequisite: CIM 255L. Recommended Preparation: CIS 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

CIS 231: VBA Programming **3 Units**

3 hours lecture

Corequisite: CIM 255L. Recommended Preparation: CIS 1 and basic knowledge of Microsoft applications.

This course focuses on application development using VBA (Visual Basic for Applications) with Microsoft Office and non-Microsoft products. Topics include VBA syntax; program design; programming techniques using sequence, selection, repetition program structures, dialog boxes and automation; and distribution of custom applications. NR

CIS 232: ASP Programming for the Internet **3 Units**

3 hours lecture

Corequisite: CIM 255L. Recommended Preparation: CIS 50A.

This course introduces students to the Active Server Pages (ASP) programming language on the World Wide Web. Major topics include client/server methodologies, ASP objects, installable components, and the use of ASP to display and retrieve data from databases. NR

CIS 233: CGI/Perl Programming for the Internet **3 Units**

3 hours lecture

Corequisite: CIM 255L. Recommended Preparation: CIS 50A.

This course is an introduction to the CGI (Common Gateway Interface) and the Perl programming language. The course covers the CGI protocol and the use of the Perl scripting to perform common and useful e-commerce tasks on a Web server. Topics include forms, counters, and file manipulation. Students will use Perl to build scripts that process users' form submissions. NR

CIS 250A: Oracle Programming I **3 Units**

3 hours lecture

Corequisite: CIM 255L. Recommended Preparation: CIS 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

CIS 250B: Oracle Programming II **3 Units**

3 hours lecture

Prerequisite: CIS 250A. Corequisite: CIM 255L.

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

Computer Science (Lab)

CIS 50L: Computer Information Science Laboratory **1 Unit**

3 hours learning center

Corequisite: Concurrent enrollment in any computer science course numbered 1-99.

This course is the laboratory component for computer science courses. This course will be graded on a credit/no-credit basis only. R-E-99

CIS 100L: Computer Information Science Laboratory **1 Unit**

3 hours learning center

Corequisite: Concurrent enrollment in any computer information science course numbered 100-199.

This course is the laboratory component for computer science courses. This course will be graded credit/no-credit basis only. R-E-99

CIS 181L: Computer Chemistry Laboratory **1 Unit**

3 hours learning center

Corequisite: Chem. 1A, 1B, 3, 4, 12A, or 12B.

This course is designed to provide students opportunities to use appropriate computer software in order to clarify chemical concepts, to use these concepts to solve problems, and perform simulated lab activities. Such hands-on experience will strengthen student understanding of chemical concepts, build self-confidence, and increase the chances of success in the chemistry program. R-E-3

CIS 205L: Computer-Aided Drafting Access Laboratory **1 Unit**

3 hours learning center

Corequisite: Dr. 100, 101, 102, 150, 160 or 180; or Engr. 23, 183 or 184; or Engrt. 130.

This course allows students taking drafting CAD courses access to applications software to support their coursework. R-E-99