

COMPUTER SCIENCE

SCHOOL OF MATHEMATICS, COMPUTER SCIENCE AND ENGINEERING

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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 of Achievement 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 Certificate of Competency in Database.

DEGREE OPTIONS

• Associate in Science Degree in Computer Science

Business Programming Emphasis
Computer Languages Emphasis
Systems Analysis Emphasis

Students must complete a minimum of 60 units of credit, including the courses in the major ("Major Requirements") and general education requirements (pages 56-61), with an overall GPA of 2.0 or better. A minimum of 12 units must be completed at Irvine Valley College. See pages 52-54 for further information.

CERTIFICATE OPTIONS

• Certificate of Achievement in Computer Science

Business Programming Emphasis
Computer Languages Emphasis
Systems Analysis Emphasis

• 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 55 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 182) and "Transfer Planning" (page 63); (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.

MAJOR REQUIREMENTS

ASSOCIATE IN SCIENCE DEGREE OR CERTIFICATE OF ACHIEVEMENT

BUSINESS PROGRAMMING EMPHASIS

Complete the following courses:		Units
CIS 1	Introduction to Computer Information Systems	4
CIS 21	Introduction to Software Engineering	4
CIS 30	BASIC Programming	4
CIS 50A	HTML Programming	4
CIS 101	Introduction to Micro-computer Applications	4
CIS 130	Visual Basic Programming	4
CIS 230	Advanced Visual Basic Programming	3.5
TOTAL UNITS:		27.5

COMPUTER LANGUAGES EMPHASIS

Complete the following course:		Units
CIS 1	Introduction to Computer Information Systems	4
Complete any four of the following courses:		
CIS 30	BASIC Programming	4
CIS 34	Pascal Programming	4
CIS 36	C Programming	4
CIS 37	C++ Programming	4
CIS 40A	Computer Organization and Assembly Language I	4
CIS 130	Visual Basic Programming	4
CIS 231	VBA Programming	3.5
Complete any two of the following courses:		
CIS 38	World Wide Web/Internet Using Java Programming	4
CIS 41	Data Structures	4
CIS 230	Advanced Visual Basic Programming	3.5
CIS 238	Advanced Java Programming	3.5
TOTAL UNITS:		26.5-28

MAJOR REQUIREMENTS

ASSOCIATE IN SCIENCE DEGREE OR CERTIFICATE OF ACHIEVEMENT

SYSTEMS ANALYSIS EMPHASIS

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

CERTIFICATE OF COMPETENCY: DATABASE

Complete the following courses:		Units
CIS 131	Database Management Programming	4
CIS 250A	Oracle I Programming	3.5
CIS 250B	Oracle II Programming	3.5
Complete one of the following courses:		
CIS 38	World Wide Web/Internet Using Java Programming	4
CIS 130	Visual Basic Programming	4
CIS 231	VBA Programming	3.5
CIS 230	Advanced Visual Basic Programming	3.5
TOTAL UNITS:		14.5-15

COURSES

CIS 1: Introduction to Computer Systems

4 Units
3 hours lecture, 3 hours lab
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

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

4 Units
3 hours lecture, 3 hours lab
Prerequisite: Two previous computer programming courses
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 30: BASIC Programming

4 Units
3 hours lecture, 3 hours lab
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. CIS 30 was formerly CIS 30A. NR

CIS 34: Pascal Programming

4 Units
3 hours lecture, 3 hours lab
Recommended Preparation: CIS 30
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

4 Units
3 hours lecture, 3 hours lab
Prerequisite: CIS 34 or 40A
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

4 Units
3 hours lecture, 3 hours lab
Prerequisite: CIS 36
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

4 Units
3 hours lecture, 3 hours lab
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. NR

CIS 40A: Computer Organization and Assembly Language I

4 Units
3 hours lecture, 3 hours lab
Prerequisite: Any two programming language courses
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

4 Units

*3 hours lecture, 3 hours lab**Prerequisite: CIS 40A*

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

4 Units

*3 hours lecture, 3 hours lab**Prerequisite: One year of programming and Math 253*

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

4 Units

*3 hours lecture, 3 hours lab**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. NR

CIS 50B: Dynamic HTML Programming and Scripting

4 Units

*3 hours lecture, 3 hours lab**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). No UC credit. NR

CIS 101: Introduction to Microcomputer Applications

4 Units

3 hours lecture, 3 hours lab

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

4 Units

*3 hours lecture, 3 hours lab**Prerequisite: CIS 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. 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

4 Units

3 hours lecture, 3 hours lab

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

4 Units

*3 hours lecture, 3 hours lab**Recommended Preparation: CIM 104.1*

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

3.5 Units

*3 hours lecture, 1.5 hours lab**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

3.5 Units

*3 hours lecture, 1.5 hours lab**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

3.5 Units

*3 hours lecture, 1.5 hours lab**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

3.5 Units

*3 hours lecture, 1.5 hours lab**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 238: Advanced JAVA Programming

3.5 Units

*3 hours lecture, 1.5 hours lab**Prerequisite: CIS 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

CIS 250A: Oracle Programming I

3.5 Units

*3 hours lecture, 1.5 hours lab**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

3.5 Units

*3 hours lecture, 1.5 hours lab**Prerequisite: CIS 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

COMPUTER LAB**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**Engr. 23, 183 or 184; or Engt. 130*

This course allows students taking drafting CAD courses access to applications software to support their coursework. R-E-3