COMPUTER SCIENCE – COMSC

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Math and Computer Science Division
Math Building, Room 267

The computer science department offers courses in three general areas, each targeted to serve students with specific needs:

1. General education students seeking a computer literacy course that will transfer to both CSU and UC campuses and/or provide hands-on instruction in the use of personal computer for classroom and research needs (COMSC-101)

2. Computer science transfer students planning to major in computer science or computer engineering at a four-year school (COMSC-110, 165, 200, 210, 255, 260)

3. Information systems (programming) professionals who are seeking to update their skills, (COMSC-120, 121, 171, 172, 255, 256, 257)

Possible career opportunities

Study in computer science prepares students for careers in programming, computer operations, systems analysis and engineering, and web design, as well as artificial intelligence, robotics, and software engineering and development. Some career options require more than two years of college study.

Besides offering courses designed to meet lower-division requirements for a major in computer science, there is also a wide variety of courses covering current popular topics and new software development tools and languages. Such courses provide a path for working professionals to upgrade their skill-set and keep abreast with current technology.

Program-level student learning outcomes

Program learning outcomes are subject to change. The most current list of program learning outcomes for each program is published on the DVC website at **www.dvc.edu/slo**.

Associate in science degree
Computer science

Students completing the program will be able to...

A. create computer programming solutions using either the C++ or Java programming language.

B. read and write programs written in x86 assembly language, and interface them with C++ programs.

C. effectively use either the C++ Standard Template Library or the Java util package to manage data structures in programs.

D. make the right choices of language, platform, data structures, and databases for a computer programming solution based on their knowledge of the elements of program design.

The associate in science in computer science is designed as a two-year curricular pathway that offers students a broad general education while integrating an in-depth study of computer science. Students will be prepared to assume entry-level positions in business and industry. Many of the courses are also applicable toward advanced levels of study. Students who intend to transfer to a four-year program in computer science should consult with a counselor regarding other mathematics and science requirements. To earn a degree, students must complete each course used to meet a major requirement with a "C" grade or higher, and complete all general education requirements as listed in the catalog. Certain courses may satisfy both major and other general education requirements; however the units are only counted once.

major requirements: units
COMSC-110   Introduction to Programming...........................4
COMSC-165   Advanced Programming with C and C++........4
COMSC-210   Program Design and Data Structures 4
COMSC-260   Assembly Language Programming/
    Computer Organization....................................4

plus at least 4 units from:
COMSC-200   Object Oriented Programming C++.................4
COMSC-256   Advanced Java Programming..........................4

plus at 0-5 units from:
MATH-192   Analytic Geometry and Calculus I 5
MATH-193   Analytic Geometry and Calculus II 5
MATH-195   Discrete Mathematics 4

plus 0-8 units from:
PHYS-130   Physics for Engineers and Scientists A:
    Mechanics and Wave Motion............................4
PHYS-230   Physics for Engineers and Scientists B:
    Heat and Electro-Magnetism...........................4
    total minimum required units   20

Certificate of achievement
Computer science -
Advanced C++ programming

Students completing the program will be able to...

A. create computer programming solutions using C++ and OOP.

B. effectively apply inheritance and polymorphism in C++ class design.

C. "overload" common C++ operators for objects.

This program prepares students for a variety of programming positions and is especially suitable for students who have four-year degrees. To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher.

required courses: units
COMSC-110   Introduction to Programming 4
COMSC-165   Advanced Programming with C and C++ 4
COMSC-200   Object Oriented Programming C++.................4
    total minimum required units   12

Computer science

Certificate of achievement
Computer science -
Advanced Java programming

Students completing the program will be able to...

A. create computer programming solutions using Java and GUI.

B. write multithreaded Java programs.

This program prepares students for a variety of programming positions and is especially suitable for students who have four-year degrees. To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher.

required courses:		*units*
COMSC-110	Introduction to Programming	4
COMSC-255	Programming with Java	4
COMSC-256	Advanced Java Programming	4
	total minimum required units	**12**

Certificate of achievement
Computer science -
Computer architecture

Students completing the program will be able to...

A. create computer programming solutions using C++.

B. read and write programs written in x86 assembly language, and interface them with C++ programs.

This program prepares students for a variety of programming positions and is especially suitable for students who have four-year degrees. To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher.

required courses:		*units*
COMSC-110	Introduction to Programming	4
COMSC-165	Advanced Programming with C and C++	4
COMSC-260	Assembly Language Programming/ Computer Organization	4
	total minimum required units	**12**

Certificate of achievement
Computer science -
Mobile and enterprise Java programming

Students completing the program will be able to...

A. create networked computer programming solutions using Java.

B. write Java programs involving sockets for TCP/IP network communications.

C. write Java programs involving Enterprise Java Beans.

This program prepares students for a variety of programming positions and is especially suitable for students who have four-year degrees. To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher.

required courses:		*units*
COMSC-110	Introduction to Programming	4
COMSC-255	Programming with Java	4
COMSC-257	Mobile and Enterprise Java Programming	4
	total minimum required units	**12**

Certificate of achievement
Computer science -
Program design

Students completing the program will be able to...

A. create computer programming solutions using C++ and the STL.

B. write custom C++ template classes to create and manage data structures.

C. evaluate algorithmic efficiency and express in "big oh".

This program prepares students for a variety of programming positions and is especially suitable for students who have four-year degrees. To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher.

required courses:		*units*
COMSC-110	Introduction to Programming	4
COMSC-165	Advanced Programming with C and C++	4
COMSC-210	Program Design and Data Structures	4
	total minimum required units	**12**

Certificate of achievement
Help desk IT specialist

Students completing the program will be able to...

A. apply the basic vocabulary of computer technology and information systems.

B. use word processing, spreadsheet, presentation, and database software to communicate effectively and professionally.

C. demonstrate basic mathematical skills in problem solving.

D. write instructions for using applications.

This program gives students the skills in computer programming, personal productivity applications, and data communications that they will need to succeed as a software support specialist in a typical office environment where administrative and financial management are supported by personal computers. To be successful the individual must have an understanding of the capabilities and limitations of microcomputers, be able to recommend personal productivity solutions to management, purchase and install stand alone and networked microcomputers and software, write instructions for using applications, and provide training on new systems.

To earn a certificate of achievement, students must complete each course used to meet a certificate requirement with a "C" grade or higher. Certificate requirements may only be completed by attending a combination of day and evening classes.

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required courses: *units*
CIS-100   Microsoft Windows – Comprehensive 2
CIS-101   Apple Mac Operating System........................2
CNT-106   Introduction to Networks 3
COMSC-101 Computer Literacy 4
COMSC-138 Advanced Microsoft Office Using Visual
             Basic for Applications (VBA)............................2

plus at least 3 units from:
CNT-114   Microsoft Windows Operating System
             Essentials/Administration 3
COMSC-110 Introduction to Programming..........................4
COMSC-171 Introduction to UNIX and Linux 2
COMSC-172 UNIX and Linux Administration........................2

             total minimum required units   16

COMSC-101 Computer Literacy
    4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Formerly COMSC-100 and COMSC-100L combined*

This introductory course in computer literacy covers the basics of computer hardware, software, and networking. Topics covered include local and cloud-based file management, productivity software for word processing, spreadsheets, databases, presentations, and home networks. An introduction to computer programming is presented. CSU, UC

COMSC-110 Introduction to Programming
    4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: Placement through the assessment process or MATH-090 or MATH-090E or MATH-090SP or equivalent*
- *Recommended: COMSC-101 or equivalent*
- *Note: See schedule of classes for programming language presented.*

This course introduces students to programming concepts emphasizing modular design and development of programs, coding style, documentation, debugging and testing. All control structures and data types of a commonly used language are covered. C-ID COMP-112. CSU, UC

COMSC-120 SQL Programming
    4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Recommended: COMSC-110 or ENGIN-135 or equivalent*
- *Note: Refer to schedule of classes for specific Oracle and SQLServer versions. Students may petition to repeat this course when software or hardware is changed. Only the first course completed will be applied toward a degree or certificate requirement. Units for both courses will apply towards the 60 units required for the degree.*

This course covers the creation and maintenance of databases and tables. It also covers storage, retrieval and manipulation of data. Both Oracle and Microsoft SQLServer are covered, including Structured Query Language (SQL) script that is common to both, and product-specific variations. CSU

COMSC-121 Database Administration
    4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Note: Refer to class schedule for specific Oracle and SQLServer versions. Students may petition to repeat this course when software or hardware is changed. Only the first course completed will be applied toward a degree or certificate requirement. Units for both courses will apply towards the 60 units required for the degree.*

This course is designed to give the database administrator (DBA) a firm foundation in basic administrative tasks and provide the necessary knowledge and skills to set up, maintain, and troubleshoot a database. Both Oracle and Structured Query Language (SQL) Server are covered. CSU

COMSC-138 Advanced Microsoft Office Using Visual Basic for Applications (VBA)
    2 units   SC
- *27 hours lecture/27 hours laboratory per term*
- *Prerequisite: COMSC-101 or equivalent*
- *Note: Students may petition to repeat this course when software or hardware is changed. Only the first course completed will be applied toward a degree or certificate requirement. Units for both courses will apply towards the 60 units required for the degree.*

This course teaches advanced features of Microsoft Office Suite, including Word, Excel, PowerPoint and Access. This course teaches customization and automation using Visual Basic for Applications (VBA). Topics include application integration, advanced functions, creating interactive forms, pivot tables, the tools, properties, objects, and language syntax of VBA and much more. CSU

COMSC-150 Topics in Computer Science
    .3-4 units SC
- *Variable hours*
- *Note: Students may petition to repeat this course when software or hardware is changed. Only the first course completed will be applied toward a degree or certificate requirement. Units for both courses will apply towards the 60 units required for the degree.*

A supplemental course in computer science to provide a study of current concepts and problems. Specific topics will be announced in the schedule of classes. CSU

COMSC-165 Advanced Programming with C and C++
    4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: COMSC-110 or ENGIN-135 or equivalent*

The course emphasizes programming techniques using C and C++ languages. The syntax of C will be reviewed, then advanced topics such as string processing, pointers, links lists, queues, stacks, and dynamic memory allocation will be covered. C-ID COMP 122. CSU, UC

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COMSC-171 Introduction to UNIX and Linux
2 units   SC
- *27 hours lecture/27 hours laboratory per term*

This is an introductory course in UNIX and Linux operating systems. This course covers scripting and the shell, access control, controlling processes, booting and shutting down, permissions, filesystems, utility programs, editors, usage of network services, storage, AWK scripting, and X Window graphics. CSU, UC

COMSC-172 UNIX and Linux Administration
2 units   SC
- *27 hours lecture/27 hours laboratory per term*
- *Recommended: COMSC-171 or equivalent*

This course prepares the student to install, configure, and maintain a UNIX or Linux system. Topics include installation, booting, user management, hardware configuration, backup, package management, Transmission Control Protocol/Internet Protocol (TCP/IP) configuration, Dynamic Host Control Protocol (DHCP) servers configuration, Domain Name Server (DNS) server configuration, file server configuration, web server configuration, routing, packet filtering, and security. Course content will apply to all UNIX and Linux flavors. CSU

COMSC-200 Object Oriented Programming C++
4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: COMSC-165 or equivalent*

This course provides detailed coverage of the concepts and syntax of the C++ Language. Topics include inheritance, overloaded operators, overloaded default operators, virtual functions, memory management, files, streams, templates, and exceptions. CSU, UC

COMSC-210 Program Design and Data Structures
4 units   LR
- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: COMSC-165 or equivalent*
- *Recommended: COMSC-200 or equivalent*

This course presents techniques relevant to program design and selection of data structures for larger programs. Topics include design techniques, effective use of recursion, algorithmic efficiency and O-notation, linked lists, binary trees, B-trees, graphs, sorting and searching techniques. Extensive programming of a variety of data structures is practiced. C-ID COMP 132, CSU, UC

COMSC-255 Programming with Java
4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Recommended: COMSC-110 or equivalent*

This course emphasizes programming techniques using the Java programming language. The syntax and deployment of Java applications are reviewed. Advanced topics such as objects, classes, methods, Object Oriented Programming (OOP) principles, Graphical User Interface (GUI), Input/Output (I/O), data structures, applets, networking, and threads are covered. CSU, UC

COMSC-256 Advanced Java Programming
4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Recommended: COMSC-255 or equivalent*

This course covers advanced topics in Java programming including multithreading, exception handling, serialization, reflection, model view controller architecture, java beans, servlets and database connectivity. CSU, UC

COMSC-257 Mobile and Enterprise Java Programming
4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Recommended: COMSC-255 or equivalent*

The course introduces Mobile and Enterprise programming concepts using the Java programming language. The Mobile programming topics include activities, services, broadcast receivers, content providers, telephony, text messaging and location services. The Enterprise programming concepts include Enterprise Java Beans (EJB's), session beans, entity beans, message driven beans, and Java Naming and Directory Services (JNDI). CSU

COMSC-260 Assembly Language Programming/ Computer Organization
4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Prerequisite: COMSC-165 or equivalent*

This course covers the basics of machine architecture, machine language, assembly language, operating system interface, and interfacing with high level languages. Topics include data representation, instruction representation and execution, addressing, indexing, macros, subroutine linkages, storage and time efficiency issues, interrupt descriptor tables, virtual memory, cache memory, and dynamic address translation. C-ID COMP 142. CSU, UC

COMSC-275 Introduction to Web Programming Using PHP and JavaScript
4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Recommended: COMSC-110 or equivalent*

This is an introductory course that presents the basic concepts and applications of web programming. The course uses the JavaScript on the client side and PHP (Hypertext Preprocessor) on the server side and introduces the PHP language and covers the basics of the JavaScript language. HTML (Hyper Text Markup Language) and CSS (Cascading Style Sheets) are also reviewed. CSU

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COMSC-276 Intermediate Web Programming Using PHP and MySQL

4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Recommended: COMSC-275 or equivalent*

This course presents the basic concepts and applications of server side web programming. PHP (Hypertext Preprocessor) is used as the server side programming language and MySQL as the database language. PHP language constructs are used to interface with the database. CSU

COMSC-277 Advanced Web Programming Using PHP

4 units   SC
- *54 hours lecture/54 hours laboratory per term*
- *Recommended: COMSC-275 or equivalent*

This is an advanced web programming course that presents advanced concepts and application of both client and server side programming. The JavaScript language as the client side and PHP (Hypertext Preprocessor) as the server side programming language and MySQL as the database will be used. CSU