Definition

Computerized systems are an integral part of today's society, and understanding them is key to success. Computer information science, computer networking, and computer applications are fields that are dynamic, exciting, and rewarding for people who enjoy challenges. At AVC, the computer studies programs are designed to provide students with the skills necessary to compete in computer- related fields or to prepare for further study at the university level.

Staff

To access faculty and staff, dial (661) 722-6300, then the 4-digit extension.

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Program Description

The Computer Applications, Computer Networking, Computer Software Developer, and Business Computer Information Science programs continue to evolve with technology. The Computer Applications program concentrates on microcomputer applications in the area of electronic spreadsheets, electronic presentations, database management, word processing, networks, Internet, and computer operating systems.

The Computer Networking Certificate provides students with entry-level skills and the essential knowledge needed to succeed in the computer networking field. The certificate program also provides an opportunity for students to expand their knowledge through advanced networking and network operating system classes.

In the Computer Software Developer Program, students explore the theory of software design and improve individual skills through a "hands-on" approach to writing, testing, and debugging computer programs. Students will develop analytical skills, along with a solid foundation in several computer programming languages, through the analysis of generalized computer algorithms.

The Business Computer Information Science Program offers students an opportunity to develop computer skills in a business environment. Through theoretical discussions and a "hands-on" approach, students will explore the integration of business and computer concepts, while developing skills necessary to enter and succeed in the work environment.

Students must receive a minimum grade of "C" or better in all required core courses and the specific courses listed as program electives in order to qualify for the degree or certificate.

Distinctive Features

Most computer courses include in-class time for "hands-on" computer work. Students in computer studies have access to open computer labs outside of class time. These open computer labs provide computer access for students who may not have the hardware or software required for computer courses.

Career Options

Business Applications Programmer
Communications Manager
Computer Engineer
Computer Sales
Database Specialist
Network Administrator
Programming Manager
Scientific Applications Programmer
Software Application Specialist
Software Engineer
Systems Analyst
Systems Programmer

(Some of these careers may require education beyond the two-year college level.)

Program Learning Outcomes

Computer Applications

1. Demonstrate an understanding of computer components and explain their purpose.

2. Demonstrate the ability to use a word processing software application.
3. Demonstrate the ability to use a spreadsheet software application.
4. Demonstrate the ability to use a database management software application.

Computer Networking, and Computer Networking Multi-Platform

1. Demonstrate the ability to setup, configure, troubleshoot, and maintain a microcomputer operating system.
2. Demonstrate networking skills that include installing, configuring, and troubleshooting network devices, protocols, and services.
3. Demonstrate networking administration skills related to server operating systems, network security, and directory services administration.

Business Computer Information Science

1. Create common documents in an Office Application Suite.
2. Design, create and test a program in a high-level, object-oriented, programming language based on a given set of specifications.
3. Identify the primary hardware components of a complete computer system.

Computer Software Developer

1. Design, create and test a program in a high-level, object-oriented, programming language based on a given set of specifications.
2. Design, create and test a program in assembly language based on a given set of specifications.
3. Solve common problems in the Binary and Hexadecimal numbering systems.

Certificate Programs

Computer Applications

This certificate requires a minimum of 31 units. A maximum of 6 pass/no pass units will be accepted for any of these certificates.

Required Courses:	**units**
CA 103, Intro. to Computers and Dig. Tech. ***or*** CA 221, Computer Concepts and Applications in Business	3-4
CA 111, Word Processing–Microsoft Word	3
CA 121, Microcomputer Spreadsheets	3
CA 131, Relational Database Management and Design	3
CA 151, Microcomputer Operating Systems	3
CA 171, Introduction to Networking	3
CIS 145, Intro. to Visual BASIC.NET Programming ***or*** CA 175, Administering Windows Server ***or*** CIS 157, Intro. to LINUX	3
CIS 141, Intro. to Basic Programming	3
MATH 102, Intermediate Algebra	4
Program Elective	3
	Total 31-32

For a recommended plan of study for the certificate, please refer to the Associate Degree plan minus the general education requirements.

Program Electives:	**units**
Select any 3 units from the following program electives.	
CA 103, Intro. to Computers and Dig. Tech.	3
CA 175, Administering Windows Server	3
CA 199, Occupational Work Experience	1-8
CA 221, Computer Concepts and Applications in Business	4
CIS 145, Introduction to Visual BASIC.NET Programming	3
CIS 157, Introduction to LINUX	3
CIS 199, Occupational Work Experience	1-8

NOTE: Substitutions, with prior permission, may be made for certain courses that may not be offered in the two-year period.

Computer Networking

The Computer Networking Program consists of two parts: the Computer Networking Core Certificate–an 18-unit, entry-level certificate composed of five basic computer courses and one network operating system elective; and the Computer Networking Multi-Platform Certificate–a 30-unit program that includes the six courses in the Core program plus two more networking operating system courses and two computer networking electives to provide the student with a breadth of networking experience.

A maximum of 6 pass/no pass units will be accepted for any of these certificates.

Computer Networking Core

This entry-level "core" certificate is composed of five basic computer courses and one network operating system elective for a total of 18 units.

Required Courses:	**units**
CA 107, Microcomputer Hardware and Software Support	3
CA 151, Microcomputer Operating Systems	3
CA 171, Intro. to Networking	3
CA 175, Administering Windows Server ***or*** CIS 157, Intro. to LINUX	3
CA 176, Windows Server Networking	3
CA 182, Network Security	3
	Total 18

For a recommended plan of study for the certificate, please refer to the Associate Degree plan minus the general education requirements.

NOTE: Substitutions, with prior permission, may be made for certain courses that may not be offered in the two-year period.

Computer Networking Multi-Platform

The Multi-Platform Certificate builds on the Computer Networking Core certificate to enhance the skills and knowledge of the student. Any course taken in the Core Certificate does not need to be taken again for the Multi-Platform Certificate.

Required Courses:	**units**
CA 107, Microcomputer Hardware and Software Support	3
CA 151, Microcomputer Operating Systems	3
CA 171, Intro. to Networking	3
CA 175, Administering Windows Server	3
CA 176, Windows Server Networking	3
CA 182, Network Security	3
CIS 157, Intro. to LINUX	3
CIS 159, SUSE Linux Server Administration	3
Program Electives	6
Total	**30**

For a recommended plan of study for the certificate, please refer to the Associate Degree plan minus the general education requirements.

Program Electives:	**units**
Select 6 units from the following networking program electives:	
CA 103, Intro. to Computers and Dig. Tech.	3
CA 131, Relational Database Management and Design	3
CA 132, Oracle SQLDatabase Management	3
CA 153, Windows Installation and System Support	3
CIS 111, Introduction to Programming and Algorithms	3
CIS 113, Data Structures	3
CIS 123, Assembly Language and Computer Architecture	3
CIS 141, Introduction to Basic Programming	3
CIS 145, Intro. to Visual BASIC.NET Programming	3
CIS 161, Introduction to C Programming	3
CIS 173, Introduction to C++ Programming	3
CIS 175, Java Programming	3

NOTE: Substitutions, with prior permission, may be made for certain courses that may not be offered in the two-year period.

Business Computer Information Science

This certificate requires a minimum of 30 units. This program provides entry-level training to the person entering the computer field and focuses on the operation and programming of computers with a emphasis on business application. CIS jobs go by a variety of titles, including applications developer, programmer analyst, software developer, customer support specialist, help desk technician, workstation support specialist, database designer, database analyst, database security, network control operator, network security administrator, internet developer, webmaster, internet systems integrator, among others.

A maximum of 6 pass/no pass units will be accepted for any of these certificates.

Required Courses:	**units**
ACCT 201, Financial Accounting	4
BUS 101, Intro. to Business ***or*** MGT 101, Mgt. Principles	3
BUS 105, Business Mathematics ***or*** MATH 128, College Alegebra for Liberal Arts ***or*** MATH 140, Precalculus	3-5
CA 103, Intro. to Computers and Dig. Tech. ***or*** CA 221, Computer Concepts and Applications in Business ***or*** CIS 101, Intro. to Computer Information Science	3-4
CA 121, Microcomputer Spreadsheets ***or*** ACCT 121, Micro-computer Accounting	2-3
CA 171, Introduction to Networking	3
CIS 111, Intro. to Programming and Algorithms ***or*** CIS 145, Intro. to Visual BASIC.NET Programming	3
CIS 141, Introduction to BASIC Programming	3
Program Electives	2-6
Total	**30**

For a recommended plan of study for the certificate, please refer to the Associate Degree plan minus the general education requirements.

Program Electives:	**units**
Select any 2-6 units from the following program electives.	
ACCT 121, Microcomputer Accounting	2
BUS 101, Introduction to Business	3
BUS 105, Business Mathematics	3
CA 103, Intro. to Computers and Dig. Tech.	3
CA 121, Microcomputer Spreadsheets	3
CA 199, Occupational Work Experience	1-8
CA 221, Computer Concepts and Applications in Business	4
CIS 111, Introduction to Programming and Algorithms	3
CIS 145, Introduction to Visual BASIC.NET Programming	3
CIS 199, Occupational Work Experience	1-8
MATH 128, College Algebra for Liberal Arts	3
MATH 140, Precalculus	5
MGT 101, Management Principles	3

NOTE: Substitutions, with prior permission, may be made for certain courses that may not be offered in the two-year period.

Computer Software Developer

This certificate requires a minimum of 36 units. This program provides entry-level training to the person entering the computer programming field. The focus is on software development, and allows specialization in several programming languages. Certificate have enhanced employability in several fields. Career choices include systems programmer, systems software developer, applications programmer, web programmer and database administrator.

A maximum of 6 pass/no pass units will be accepted for any of these certificates.

Required Courses:	**units**
CA 131, Relational Database Management and Design	3
CA 151, Microcomputer Operating Systems	3
CIS 101, Intro. to Computer Info. Science	3
CIS 111, Intro. to Programming and Algorithms	3
CIS 113, Data Structures	3
CIS 121, Computer Mathematics	3
CIS 123, Assembly Language and Computer Architecture	3
CIS 161, Intro. to C Programming	3
MATH 128, College Algebra for Liberal Arts ***or*** MATH 150, Calculus and Analytic Geometry ***or*** MATH 220, Linear Algebra	3-5

PHIL 110, Intro. to Logic	3
Program Electives	4-6
	Total 36

For a recommended plan of study for the certificate, please refer to the Associate Degree plan minus the general education requirements.

Program Electives:	**units**
Select any 4-6 units from the following program electives.	
CIS 157, Introduction to LINUX	3
CIS 173, Introduction to C++ Programming	3
CIS 174, Introduction to C#.NET Programming	3
CIS 175, Java Programming	3
CIS 199, Occupational Work Experience	1-8
MATH 128, College Algebra for Liberal Arts	4
MATH 140, Precalculus	5
MATH 150, Calculus and Analytical Geometry	5
MATH 220, Linear Algebra	4

NOTE: Substitutions, with prior permission, may be made for certain courses that may not be offered in the two-year period.

TRANSFER STUDENTS:
Students planning to transfer to a four-year institution are strongly advised to follow the Business Administration degree listed in the Business section of this catalog.

Associate Degrees

Computer Applications

The requirements for an associate degree in Computer Applications may be satisfied by completing the Computer Applications certificate, 21 units of general education requirements, and sufficient elective credits to total 61-62 units. (See Graduation/Associate Degree Requirements.)

Students who complete the associate degree have enhanced employability in several fields, and are well prepared for entry-level career opportunities in areas such as information technology, help desk support, and general office computer management. The associate degree will also provide students with a broad range of knowledge with which to evaluate and appreciate the physical environment, culture, and society in which they live, with the ability to think and communicate clearly and effectively.

Except in cases of a prerequisite requirement, it is not required that courses be taken in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Plan of Study

First Semester	**units**
CA 103, Intro. to Computers and Dig. Tech. ***or*** CA 221, Computer Concepts and Applications in Business	3-4
MATH 102, Intermediate Algebra	4
Course from GE requirement Area B	3
Course from GE requirement Area D1	3
Elective	3
	Total 16-17

Second Semester	**units**
CA 121, Microcomputer Spreadsheets	3
CA 151, Microcomputer Operating Systems	3
Course from GE requirement Area D2	3
Course from GE requirement Area F (BUS 212 or MGT 212 recommended)	3
Program Elective	3
	Total 15

Third Semester	**units**
CA 111, Word Processing–Microsoft Word	3
CA 171, Introduction to Networking	3
CIS 141, Introduction to BASIC Programming	3
Course from GE requirement Area C	3
Elective	3
	Total 15

Fourth Semester	**units**
CA 131, Relational Database Management and Design	3
CIS 145, Intro. to Visual BASIC.NET Programming ***or*** CA 175, Administering Windows Server ***or*** CIS 157, Intro. to LINUX	3
Course from GE requirement Area A	3
Course from GE requirement Area E	3
Elective	3
	Total 15

Degree Total 61-62

Program Electives:
Please refer to the Program Electives listed under the certificate program.

Computer Networking

The requirements for an associate degree in Computer Networking Multi-Platform may be satisfied by completing the Computer Networking Multi-Platform certificate, 21 units of general education requirements, and sufficient elective credits to total 60 units (See Graduation/Associate Degree Requirements).

Students who complete the associate degree have enhanced employability in several fields, and are well prepared for entry-level career opportunities in areas such as computer repair, service, maintenance, and installation of computer network hardware and software. The associate degree will also provide students with a broad range of knowledge with which to evaluate and appreciate the physical environment, culture, and society in which they live, with the ability to think and communicate clearly and effectively.

Except in cases of a prerequisite requirement, it is not required that courses be taken in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Plan of Study

First Semester	**units**
CA 107, Microcomputer Hardware and Software Support	3
CA 151, Microcomputer Operating Systems	3
Course from GE requirement Area B	3
Course from GE requirement Area D1	3
Elective	3
	Total 15

Second Semester	**units**
CA 171, Intro. to Networking	3
CA 175, Administering Windows Server	3
Course from GE requirement Area A	3
Course from GE requirement Area D2	3
Elective	3
	Total 15

Third Semester	**units**
CA 176, Windows Server Networking	3
CIS 157, Intro. to LINUX	3
Course from GE requirement Area C	3
Course from GE requirement Area E	3
Elective	3
	Total 15

Fourth Semester	**units**
CA 182, Network Security	3
CIS 159, SUSE Linux Server Administration	3
Course from GE requirement Area F	3
Program Elective	6
	Total 15

Degree Total 60

Program Electives:
Please refer to the Program Electives listed under the certificate program.

Business Computer Information Science

The requirements for an associate degree in Business Computer Information Science may be satisfied by completing the certificate program in addition to the associate degree requirements. (See Graduation/Associate Degree Requirements.)

Students who complete the associate degree have enhanced employability in several fields. With a varied background in Business, Computer Programming and Computer Applications, students are well prepared for full-time, entry-level positions in the programming of business and other applications as well as advanced use of existing office applications in industry. The associate degree will also provide students with a broad range of knowledge with which to evaluate and appreciate the physical environment, culture, and society in which they live, with the ability to think and communicate clearly and effectively.

Except in cases of a prerequisite requirement, it is not required that courses be taken in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Plan of Study

First Semester	**units**
BUS 101, Intro. to Business ***or*** MGT 101, Mgt. Principles	3
BUS 105, Business Mathematics ***or*** MATH 128, College Alegebra for Liberal Arts ***or*** MATH 140, Precalculus	3-5
CA 103, Intro. to Computers and Dig. Tech. ***or*** CA 221, Computer Concepts and Applications in Business ***or*** CIS 101, Intro. to Computer Info. Science	3-4
Course from GE requirement Area D1	3
Elective	3
	Total 15-18

Second Semester	**units**
ACCT 201, Financial Accounting	4
CIS 141, Intro. to BASIC Programming	3
Course from GE requirement Area B	3
Course from GE requirement Area D2	3
Elective	3
	Total 16

Third Semester	**units**
CA 121, Microcomputer Spreadsheets ***or*** ACCT 121, Micro-computer Accounting	2-3
CIS 111, Intro. to Programming and Algorithms ***or*** CIS 145, Intro. to Visual BASIC.NET Programming	3
Course from GE requirement Area A	3
Course from GE requirement Area C	3
Program Elective	2-3
	Total 14-15

Fourth Semester	**units**
CA 171, Introduction to Networking	3
Course from GE requirement Area E	3
Course from GE requirement Area F (BUS 212 or MGT 212 recommended)	3
Program Elective	0-3
Elective	3
	Total 15

Degree Total 60

Program Electives:
Please refer to the Program Electives listed under the certificate program.

Computer Software Developer

The requirements for an associate degree in Computer Software Developer may be satisfied by completing the certificate program in addition to the associate degree requirements. (See Graduation/Associate Degree Requirements.)

Students who complete the associate degree have enhanced employability in the field of computer programming/software development, and are well prepared for full-time, entry-level positions in such job titles as programmer or programmer/analyst. The associate degree will also provide students with a broad range of knowledge with which to evaluate and appreciate the physical environment, culture, and society in which they live,

with the ability to think and communicate clearly and effectively.

Except in cases of a prerequisite requirement, it is not required that courses be taken in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Plan of Study

First Semester	**units**
CIS 101, Introduction to Computer Information Science	3
MATH 128, College Algebra for Liberal Arts ***or***	
MATH 150, Calc. & Analytic Geometry ***or***	
MATH 220, Linear Algebra	3-5
Course from GE requirement Area B	3
Course from GE requirement Area D1	3
Elective	3
Total	**16-17**

Second Semester	**units**
CIS 111, Intro. to Programming and Algorithms	3
CIS 121, Computer Mathematics	3
CIS 161, Intro. to C Programming	3
PHIL 110, Introduction to Logic	3
Course from GE requirement Area D2	3
Total	**15**

Third Semester	**units**
CIS 113, Data Structures	3
CIS 123, Assembly Language and Computer Architecture	3
Course from GE requirement Area A	3
Course from GE requirement Area F	3
(BUS 212 or MGT 212 recommended)	
Program Elective	2-3
Total	**15**

Fourth Semester	**units**
CA 131, Relational Database Management and Design	3
CA 151, Microcomputer Operating Systems	3
Course from GE requirement Area C	3
Course from GE requirement Area E	3
Program Elective	2-3
Total	**15**

Degree Total 60

Program Electives:
Please refer to the Program Electives listed under the certificate program.

Transfer

Students planning to continue studies at a four-year college or university after AVC should visit the Transfer Resource Center and consult with a counselor as soon as possible. Additional information on official transfer articulation agreements from AVC to many CSU/UC campuses can be found at the following Web site: *www.assist.org*

Prerequisite Completion

If a course is listed as a prerequisite for another course, that prerequisite course must be completed with a satisfactory grade in order to enroll in the next course. According to Title 5, Section 55200(d), a satisfactory grade is a grade of "A," "B," "C" or "P". Classes in which the Pass/No Pass option is available are indicated with an asterisk **(*)** before the course title. See "Pass/No Pass Option" in the catalog for full explanation.

Computer Applications Courses

CA 103 *INTRODUCTION TO COMPUTERS AND DIGITAL TECHNOLOGY

3 units
4 hours weekly
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 070.*
This course is designed to teach computer users the features of a microcomputer, how a microcomputer operates, and how to select a microcomputer that best fits individual needs. Students will learn how to use the major features of popular software applications, including word processors, spreadsheets, database managers, presentation managers, and Internet browsers. This course includes hands-on operation of a microcomputer. **NOTE**: Business and Computer oriented majors considering transfer to a university should consult with a counselor as to the appropriate computer courses to include in their program of study. (CSU, UC, AVC)

CA 107 *MICROCOMPUTER HARDWARE AND SOFTWARE SUPPORT

3 units
4 hours weekly
Advisory: *Completion of CA 103, CA 221 or CIS 101, and Eligibility for ENGL 099, READ 099, and MATH 070.*
This course is intended to provide students with a workable knowledge that is required for the installation, setup, and troubleshooting of hardware and software related to personal computers and peripheral devices. This course will help students prepare for the A+ Certification Exam. **BEFORE ENROLLING,** students should be able to create folders, format disks, copy files, rename files, create shortcuts, and use Windows Explorer. This course will involve problem solving and troubleshooting. Students should also be familiar with DOS commands and the installation of application software.(AVC)

CA 111 *WORD PROCESSING–MICROSOFT WORD

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CA 221 and OT 101, and the Ability to type 30 wpm, and Eligibility for ENGL 099 and READ 099.*
This course covers the concepts of word processing emphasizing Microsoft Word. Topics covered include preparing documents,

text formatting and editing, management of files and folders, formatting paragraphs, using multiple windows, and standard letter and punctuation styles. This vocationally oriented course will serve students seeking a certificate, associate degree, or desiring to transfer to a four-year institution. **BEFORE ENROLLING,** students should have used a word processing program to create, save, retrieve, edit, and print. (CSU, AVC)

CA 121 *MICROCOMPUTER SPREADSHEETS

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CA 221, and Eligibility for READ 099 and MATH 070.*
This course is designed to teach computer users how to develop electronic spreadsheets using spreadsheet software such as Microsoft Excel, to solve business related quantitative problems. Topics of instruction include data entry, formulas, functions, charts, macros, and other beginning to intermediate level features of spreadsheet software. **BEFORE ENROLLING,** Students should be able to save and retrieve files and perform other basic file management tasks on the computer. (CSU, AVC)

CA 131 *RELATIONAL DATABASE MANAGEMENT AND DESIGN

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CA 221, and Eligibility for READ 099 and MATH 070.*
Database management systems (DBMS) concepts and designs are explored using Microsoft Access. The relational model of database management, which is commonly used on micro and larger computers, is emphasized. The course covers database design, building a model using computer software, application generators, programming in database software, structured query language, and database administration. **BEFORE ENROLLING,** students should have used the Microsoft Access database software to create a structure, enter records, reorder records, save, and print. Students should also possess an understanding of how personal computers, software, and peripherals work together (CSU, AVC)

CA 132 *ORACLE SQL DATABASE MANAGEMENT

3 units
4 hours weekly
Advisory: *Completion of CA 103, CA 121, CA 131, or CIS 101, and Eligibility for ENGL 099, READ 099, and MATH 102.*
This course trains students to work with the Oracle Relational Database Management System in a client/server environment. In both lecture and lab, students will learn Structured Query Language (SQL) by using the Oracle SQL*Plus tool. Proper relational database design that enforces referential integrity will be taught using schema diagrams and entity relationship diagrams. SQL Data Manipulation Language (DML) for reporting and Data Definition Language (DDL) for database creation will be covered. Students will also learn about database security issues such as database users, roles and grants. This course helps prepare students for the SQL portion of Oracle's Exam #1Z0-001. **BEFORE ENROLLING,** students should have used database software to create a table, enter, edit and delete records, and sort the records. It is also recommended that students understand how to save and retrieve files from local and network drives. (CSU, AVC)

CA 141 *DEVELOPING POWERPOINT PRESENTATIONS

1.5 units
36 hours total
Advisory: *Completion of CA 103 or CA 221.*
Students will acquire intermediate knowledge of presentation graphics software by using Microsoft PowerPoint. Students will create various types of presentations and will learn to insert and edit objects to produce the desired graphics. This will include bulleted lists, clip art, sounds, graphs, and tables. **BEFORE ENROLLING,** students should be able to perform basic operations of a personal computer including working with a keyboard and mouse. There should also be a basic understanding of the Windows Operating System. (CSU, AVC)

CA 151 *MICROCOMPUTER OPERATING SYSTEMS

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CA 221, and Eligibility for ENGL 099 and READ 099.*
The purpose of this course is to provide an understanding of the role of an operating system in the interaction between computer hardware components and application software. The concept of how a computer works from power-on until power-off will be discussed at length, as well as the boot process. Details will be explored on how an operating system is evaluated based on user needs. This course includes discussions on Windows 7, Linux, and Mac OS. There will be extensive hands on exposure to Windows 7 and Linux. **BEFORE ENROLLING**, students should be advanced Windows Vista or Windows 7 computer users with the ability to manage disks, folders, and files using Windows Explorer. (CSU, AVC)

CA 153 *WINDOWS INSTALLATION AND SYSTEM SUPPORT

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CIS 101, Eligibility for ENGL 099, READ 099 and MATH 102.*
This course is designed to provide the knowledge and skills needed to support Microsoft Windows in both a stand-alone environment and networking environment. These skills include setup, configuration, migration, optimization, network integration, administration, troubleshooting, and messaging. **BEFORE ENROLLING,** students should be advanced Windows users with ability to create folders, copy files, rename

files, create shortcuts and execute applications. (CSU , AVC)

CA 171 *INTRODUCTION TO NETWORKING

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CA 221, and Eligibility for ENGL 099, READ 099 and MATH 070.*
This is a beginning course for the individual who would like to have a career in computer networking or for an individual who is majoring in management and needs to be able to make decisions where networks are concerned. The course will cover such topics as Local Area Networks (LANs), Wide Area Networks (WANs), Optical System Interconnection (OSI) model, protocols, physical topologies, logical topologies, network operating systems, network hardware, network troubleshooting, network maintenance, network security. This aids in the preparation for the Network+ exam. **BEFORE ENROLLING**, students should be able to manage files and folders using Windows Explorer. Students should be able to start programs within the Windows operating system and be able to browse the Internet. (CSU, AVC)

CA 175 *ADMINISTERING WINDOWS SERVER

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CA 221 or CIS 101, and Eligibility for ENGL 099 and READ 099.*
In this "hands-on" course students will create domains, administer users and groups, manage permissions and resources, and provide network resources. Students will monitor and optimize a Windows network and implement security. **BEFORE ENROLLING,** students must have basic understanding of and experience with computer technology, microcomputer hardware and software, and disk and file management. (CSU, AVC)

CA 176 *WINDOWS SERVER NETWORKING

3 units
4 hours weekly
Prerequisite: *Completion of CA 175.*
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 102.*
This course trains network administrators and support professionals to design, implement, optimize, monitor and troubleshoot networking services on a Windows server. Students will also learn Transfer Control Protocol/Internet Protocol (TCP/IP) networking design, subnetting, and address resolution. Topics covered will also include Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS), Windows Internet Naming Service (WINS), Remote Access Service (RAS), Internet Protocol (IP) routing and IP security. **BEFORE ENROLLING,** students should know how to install Microsoft Windows server, create and administer user and group accounts, set share permissions, set up network printing, and audit resources. (CSU, AVC)

CA 182 *NETWORK SECURITY

3 units
4 hours weekly
Advisory: *Completion of CA 171 or CA 175, and Eligibility for ENGL 099, READ 099 and MATH 102.*
This course is designed to provide a comprehensive look at network security and provide students with an organized view of the field, and the tools and techniques necessary to safeguard computers and data. The course will provide preparation for the Computing Technology Industry Association (CompTIA) Security + Certification exam. **BEFORE ENROLLING**, students should be familiar with Internet Protocol (IP) addressing. (CSU, AVC)

CA 183 *SECURITY COUNTERMEASURES

3 units
4 hours weekly
Prerequisite: *Completion of CA 182.*
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 102.*
This course is designed to introduce students to the tools and techniques used by security practitioners to secure an enterprise. Network and host security are covered to include servers and client computers as well as network appliances. Students will learn to scan for vulnerabilities and to mitigate those vulnerabilities in an isolated environment. Students will learn to apply the controls necessary to enforce the policies introduced in the Network Security course. (AVC)

CA 199 *OCCUPATIONAL WORK EXPERIENCE

1–8 units
hours vary
Prerequisite: *To participate in work experience, students must have a job or internship which is either paid or voluntary and have the approval of the supervisor and instructor supervising work experience in the specific subject area. PRIOR TO ENROLLING, students must attend a scheduled orientation or meet individually with the supervising instructor for an individual orientation.*
Occupational Work Experience Education is supervised employment designed to provide students a realistic learning experience through work. The ultimate goal is to teach students those skills and attitudes that will equip them to function and adapt as an employee in a variety of situations and jobs. Occupational Work Experience Education is supervised employment extending classroom-based occupational learning at an on-the-job learning station related to the students' educational major or occupational goal. Credit may be accrued at the rate of one to eight units per semester. For the satisfactory completion of all types of Cooperative Work Experience Education (WE 197 and WE 199), students may earn up to a total of sixteen semester credit hours. (CSU, AVC) **(R3)**

CA 221 *COMPUTER CONCEPTS AND APPLICATIONS IN BUSINESS

4 units
5 hours weekly
Advisory: *Completion of ACCT 201, and Eligibility for College Level Reading, ENGL 101/ENGL 101SL and MATH 070.*
This course includes an examination of information systems and their role in business. The focus will be on information systems, electronic spreadsheets, database management systems, networking, e-commerce, ethics and security, and computer systems hardware and software components. This course includes the application of these concepts and methods through hands-on projects developing computer-based solutions to business problems. **NOTE:** Computer-oriented majors should consider CIS 101. (C-ID: BUS 140, or ITIS 120) (CSU, UC, AVC)

Computer Information Science Courses

(Engineering and science majors consult counselors)

CIS 101 *INTRODUCTION TO COMPUTER INFORMATION SCIENCE

3 units
4 hours weekly
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 102.*
A beginning course designed to acquaint the student with the general concepts and basic vocabulary of computers and information systems. Includes introduction to the organization and functions of basic components of computers and information processing systems. Instruction in programming procedures and programming logic is provided. Other topics include Internet and networking fundamentals as well as basic computer software such as spreadsheets and database applications. Appropriate for the student with a general interest in this area as well as for the student desiring to pursue further training in computer science or information systems. (Engineering and science majors consult counselors.) (C-ID: BUS 140) (CSU, UC, AVC)

CIS 111 *INTRODUCTION TO PROGRAMMING AND ALGORITHMS

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CA 221 or CIS 101, and Eligibility for ENGL 099, READ 099 and MATH 102.*
This is a first course for students planning or exploring a career in software design and development. This course emphasizes a careful disciplined approach to computer programming. Problem solving through stepwise development of algorithms is presented. Students will learn programming language syntax, coding, program logic, and program testing. Students will plan, create, test, and run their own programs to solve typical problems. **BEFORE ENROLLING**, students should have basic computer experience and be able to save and retrieve files, run applications, and print documents. (Engineering and science majors consult counselors.) (C-ID: COMP 112) (CSU, UC, AVC)

CIS 113 *DATA STRUCTURES

3 units
4 hours weekly
Prerequisite: *Completion of CIS 111 or CIS 161.*
Advisory: *Completion of CIS 121, and MATH 128 or MATH 140, and Eligibility for ENGL 099 and READ 099.*
This course continues the introduction to programming and algorithms initiated in CIS 111, with a particular focus on the ideas of data abstraction and object-oriented programming. Topics include object-oriented programming, fundamental data structures, design and implementation of abstract data types, common types of collections (such as stacks, queues, lists, graphs, trees and sets), algorithm analysis and complexity, search and sort algorithms, and the use of recursion. Students plan and create programs using data structures and collection types to solve problems frequently encountered by professional computer scientists. This course is intended for students majoring in CIS. (Engineering and science majors consult counselors) (C-ID: COMP 132) (CSU, UC, AVC)

CIS 121 *COMPUTER MATHEMATICS

3 units
3 hours weekly
Advisory: *Completion of CIS 111, CIS 113, and MATH 128 or MATH 140, and Eligibility for College Level Reading and ENGL 099.*
This is an introductory course in the area of mathematics applicable to computer science. Topics include logic and circuits, sets, mathematical induction, graphs, trees, algorithm development and refinement, and computational models like finite state automata and Turing machines. Emphasis is placed on problem solving and application of mathematical theory to data structures and database construction and operation. (Engineering and science majors consult counselors) (C-ID: COMP 152) (CSU, UC, AVC)

CIS 123 *ASSEMBLY LANGUAGE AND COMPUTER ARCHITECTURE

3 units
4 hours weekly
Advisory: *Completion of CIS 111, and Eligibility for ENGL 099, READ 099 and MATH 102.*
This course introduces assembly language programming and computer architecture to enable students to understand how programs are actually executed at the machine level. Students will use Intel-compatible personal computers for the detailed study of the Intel IA-32 processor instruction set and architecture and to develop programs using a macro assembler. Both 32-bit Windows console programming and 16-bit real-mode programming are covered. Topics include machine/assembly level programming, instruction formats, internal data representation, addressing modes, procedure call and

return mechanisms, and how high-level language constructs are implemented at the machine level, basic microcomputer organization, instruction execution cycle, memory segmentation and paging, and details of programming the processor in both protected-mode and in real-mode. **BEFORE ENROLLING**, students should be proficient in writing programs in a high-level language. (Engineering and science majors consult counselors) (C-ID: COMP 142) (CSU, UC, AVC)

CIS 141 *INTRODUCTION TO BASIC PROGRAMMING

3 units
4 hours weekly
Advisory: *Completion of CA 103 or CIS 101, and Eligibility for ENGL 099, READ 099 and MATH 102.*
This course is an introduction to the structure of the BASIC (Beginners All-Purpose Symbolic Instructional Code) programming language, syntax, coding, program logic, and program testing. Students will learn the fundamentals of computer programming, problem specification, algorithm design, and the elements of the BASIC programming language. The course will include reading, writing, debugging, and verifying BASIC programs. This course will prepare students for entry-level programming jobs and upper division courses requiring BASIC programming experience. Engineering and Science majors should consult counselors. (Engineering and science majors consult counselors.) (CSU, UC, AVC)

CIS 145 *INTRODUCTION TO VISUAL BASIC. NET PROGRAMMING

3 units
4 hours weekly
Advisory: *Completion of CIS 141 and either CIS 111 or CIS 173, and Eligibility for ENGL 099, READ 099 and MATH 102.*
The students will learn the fundamentals of Microsoft Windows programming using the Visual Basic.NET programming language. The course will include designing, implementing and testing Visual Basic.NET programs, which will provide useful Windows applications to solve representative problems for business, science, mathematics, and engineering. This course is intended for students majoring in Business or CIS or those desiring to increase their programming skills. (CSU, AVC)

CIS 157 *INTRODUCTION TO LINUX

3 units
4 hours weekly
Advisory: *Completion of CA 103, CA 221 or CIS 101, and Eligibility for ENGL 099, READ 099 and MATH 102.*
This lecture and laboratory course will provide the basic understanding of using the Linux operating system. The course targets audiences that are interested in operating systems and will benefit those who are pursuing careers in Computer Information Systems, Computer Science, and Network Administration. The course will focus on the shell environment, system administration and security, programming, and the graphical user interface. **BEFORE ENROLLING,** students must have a basic understanding of and experience with computer terminology, microcomputer hardware and software, and disk and file management. (CSU, AVC)

CIS 159 *SUSE LINUX SERVER ADMINISTRATION

3 units
4 hours weekly
Prerequisite: *Completion of CA 151, CA 171, or CIS 157.*
Advisory: *Eligibility for ENGL 099 and READ 099.*
This in-depth, hands-on course covers a variety of topics: installing and configuring SUSE Linux Enterprise Server, managing users and groups, securing the system, and configuring Web services. By completing multiple lab exercises, students will be able to apply course concepts and strengthen their proficiency in Linux administration. (CSU, AVC)

CIS 161 *INTRODUCTION TO C PROGRAMMING

3 units
4 hours weekly
Advisory: *Completion of CIS 101, and Eligibility for ENGL 099, READ 099 and MATH 128.*
This course is designed to give the student an introduction to the C programming language. Students will learn the basic elements of the C language and a disciplined approach to program development using structured programming techniques for readability, maintainability and defensive programming. Problem solving through stepwise development of algorithms and the mechanics of running, testing, and debugging programs is presented. Students will plan, create, test, and run their own programs to solve typical problems. **BEFORE ENROLLING,** students should have basic computer experience and be able to save and retrieve files, run applications, print documents, and have sufficient aptitude with mathematics to solve simple algebraic equations and to appreciate the use of mathematical notation and formalism. (Engineering and science majors consult counselors.) (CSU, UC, AVC)

CIS 173 *INTRODUCTION TO C++ PROGRAMMING

3 units
4 hours weekly
Prerequisite: *Completion of CIS 161.*
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 128.*
Students will learn the syntax and semantics of the C++ programming language, what modifications and additions were made to the C programming language to produce C++, and how to implement an object-oriented design in C++. The course will include designing, implementing, and testing C++ programs that solve representative problems from business, science, mathematics, and engineering. This course is intended for students majoring in CIS. (CSU, UC, AVC)

CIS 175 *JAVA PROGRAMMING

3 units
4 hours weekly
Prerequisite: *Completion of CIS 111.*
Advisory: *Eligibility for ENGL 099, READ 099 and MATH 128.*
This course teaches the Java programming language, the extensive Java class library, and object-oriented design and programming. The students will learn techniques for using exceptions, file input/output, utility classes, multi-threading, network/Internet programming, and Graphical User Interface (GUI) programming. **BEFORE ENROLLING,** students should be able to solve programming problems using stepwise development of algorithms. Using a programming language like Java, students should be able to plan, create, test and run their own programs using proper syntax, code and logic. This course is intended for students majoring in business or CIS or those desiring to increase their programming skills. (CSU, UC, AVC)

CIS 199 *OCCUPATIONAL WORK EXPERIENCE

1–8 units
hours vary
Prerequisite: *To participate in work experience, students must have a job or internship which is either paid or voluntary and have the approval of the supervisor and instructor supervising work experience in the specific subject area. PRIOR TO ENROLLING, students must attend a scheduled orientation or meet individually with the supervising instructor for an individual orientation.*
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