projects under the direction of a faculty member in a given department. With the guidance of the faculty member, students prepare and carry out a written learning agreement describing the purposes and outcomes of the project. Students should expect to meet with the supervising faculty member one to two hours each week for conferences. Credit is based upon the number of hours in the semester expected to complete the project (2 units for 108 hours). For selected disciplines, UC transfer credit may be possible after admission to a UC campus, pending review of appropriate course materials by UC staff. See a counselor for an explanation. Course not open to students who have completed SPCH 299.
Transfer Credit: CSU

COMPUTER AND INFORMATION SCIENCES

(Science, Engineering, and Math Division)

CIS 50
BASIC COMPUTER LITERACY   0.5 UNIT

Class hours: 2.0 Laboratory
This course provides the student with a basic overview of the components of a computer and application software. This course is for the student who is not familiar with the use of the computer and its applications. Topics will include a basic introduction to computer systems hardware, Windows, Word, Excel, and PowerPoint. The class stresses hands-on use of the computer with its applications.

CIS 58A
PC OPERATING SYSTEM A+ CERTIFICATION   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 101 or CIS 102 or equivalent with a grade of "C" or higher or "Pass" or appropriate work experience.
This course is designed to cover the subject matter required for the operating systems technologies component of CompTIA's A+ Certification. Topics to be discussed include operating system installation, configuration, upgrading, troubleshooting, and networking.

CIS 58B
PC CORE HARDWARE A+ CERTIFICATION   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 101 or CIS 102 or equivalent with a grade of "C" or higher or "Pass" or appropriate work experience.
This course is designed to cover the subject matter required for the core hardware component of CompTIA's A+ Certification. Topics to be discussed include computer hardware installation, construction, upgrading, troubleshooting, repair, networking, Internet connectivity and wireless technologies.

CIS 70J
CISCO CCNA CERTIFICATION EXAM REVIEW   1.5 UNITS

Class hours: 1.5 Lecture/1.0 Laboratory
Recommendation: CIS 70G or equivalent with a grade of "C" or higher or "Pass".
This course is designed to enhance student readiness for the Cisco Certified Network Associate (CCNA) exam. It reviews all key concepts and skills required in the CCNA exam as well as exam question types and test-taking strategies.

CIS 70K
INTRODUCTION TO WIRELESS NETWORK   3.0 UNITS

Class hours: 3.0 Lecture
Recommendation: CIS 70A or equivalent with a grade of "C" or higher or "Pass".
This is an introductory course on the fundamental concepts of wireless networking. It covers the technical foundation of wireless communications and various protocols used in the current wireless applications. Topics include Wireless Application Protocol (WAP), Bluetooth, cellular telephony, Wireless Local Area Networks (WLANs), satellite communications, Global Positioning System (GPS).

CIS 101
INTRODUCTION TO COMPUTER INFORMATION SYSTEMS   3.0 UNITS

Class hours: 3.0 Lecture/1.0 Laboratory
This course provides the student with the essential knowledge required for a well-rounded understanding of the use of the computer as a tool to produce useful information in small and large organizational environments. The course allows the student to achieve an understanding of computer technology, computer hardware, computer software, and how computers can be used to produce meaningful information. The student will solve applied problems in spreadsheet preparation and analysis using Microsoft EXCEL and will be introduced to basic operational concepts in database programming using Access, in creating and editing text in Word, and be introduced to presentation graphics using PowerPoint.
*Transfer Credit: CSU; UC**
**UC credit limits may apply. CIS 101 and 102 combined: maximum credit, one course.*

CIS 102
INTRODUCTION TO MICROCOMPUTER HARDWARE AND APPLICATIONS SOFTWARE   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This course instructs the students in the use of microcomputers within an organizational environment using the Microsoft Windows interface and current applications software. Software topics include file management, elementary word processing, applications in spreadsheet use, database management, and presentation graphics.
*Transfer Credit: CSU; UC**
**UC credit limits may apply. CIS 101 and 102 combined: maximum credit, one course.*

CIS 103
COMPUTER PROGRAMMING LOGIC   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: Concurrent enrollment in or completion of CIS 101 or CIS 102 or equivalent with a grade of "C" or higher or "Pass".
This is an introductory course in computer programming logic. The student will learn concepts applicable to all programming languages, including: identifiers, data types, arrays, control structures, algorithms, modular programming, generating reports, and computer memory concepts. The student will learn to use charts commonly used in business and information processing. Program logic will be developed using flowcharts and pseudocode. Programs will be written using a programming language. The student will be

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introduced to the following additional topics: graphical user interface design, object-oriented and event-driven-programming, searching, sorting, and file processing concepts.
Transfer Credit: CSU; UC

CIS 105
USING MICROSOFT
WINDOWS   1.5 UNITS

Class hours: 1.5 Lecture/0.5 Laboratory
Recommendation: CIS 102 or equivalent with a grade of "C" or higher or "Pass".
This course covers the use of Microsoft Windows. Currently available Windows Operating Systems will be explored, including Windows 95, 98, NT, Millennium Edition, and Windows 2000. Topics include file and application management, personalizing the system, using the productivity tools, connecting to the Internet, and exchanging data. Current topics of interest relating to Windows will also be discussed.
Transfer Credit: CSU

CIS 151
MICROSOFT EXCEL FOR
INFORMATION SYSTEMS/
INFORMATION
TECHNOLOGY   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This course is a foundation class for Information Technology. The fundamentals of building worksheets include: creating worksheets, formatting, functions, formulas, macros, data tables, analysis tools, templates, Wizards, and the creation of charts. Techniques to deal with multiple worksheets and large worksheets are covered. The database functions of EXCEL will include sorting, filtering, queries, macros, and record retrieval. This course covers the topics required in industry certifications. Hands-on exercises are used to reinforce the function of EXCEL. This course is not open to students who have taken both CIS 54A and CIS 54B.
Transfer Credit: CSU

CIS 155
MICROSOFT ACCESS   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 102 or equivalent with a grade of "C" or higher or "Pass".
This is a foundation course in database management using Microsoft Access. It covers relational database concepts and design, techniques for building a

database using queries, forms, reports, and expressions. Topics also include multiple-table queries and reports and the user interface to a database. This course covers the topics in the Microsoft MOUS and other certifications.
Transfer Credit: CSU

CIS 160
WEB PAGE
DEVELOPMENT   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This course provides the knowledge, skills, and hands-on experience needed to create multimedia web pages. Using a variety of authoring tools, students will create web pages with links, graphics, tables, frames, and forms, and add dimensions of time, audio, video, motion, and interactivity to web pages. Upon completing this course, students will be ready to plan, build, promote, and maintain a professional website, which includes selecting a web host and uploading the site to a web server.
Transfer Credit: CSU

CIS 162
HTML AND CSS   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 101 or CIS 102 or equivalent with a grade of "C" or higher or "Pass".
The course will cover HTML (HyperText Markup Language) and CSS (Cascading Style Sheets) to develop Web pages. Students will learn how to specify the multimedia content of a Web page using HTML tags, and to lay out and format the Web page using CSS styles. An introduction to JavaScript and other Web client development technologies will also be included to create dynamic elements.
Transfer Credit: CSU

CIS 164
JAVASCRIPT
PROGRAMMING   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Prerequisite: CIS 103 and CIS 162 or equivalents with grades of "C" or higher or "Pass".
This course covers client-side Web scripting using JavaScript and other Web page development tools. It covers the programming techniques of JavaScript useful to Web designers. Students will learn to create interactive and dynamic Web pages.

CIS 168C
SPECIAL TOPICS
IN NETWORKING   3.0 UNITS

Class hours: 3.0 Lecture
This course is designed to provide training on the application of networking solutions to various industry specific situations. Each semester the course will focus on a different aspect of networking. Examples include but are not limited to automotive, aviation, entertainment industry, health care, home automation, industrial control, IP version 6, and recent developments in Local Area Networking (LAN) and Wide Area Networking (WAN).
Transfer Credit: CSU

CIS 169A
SPECIAL TOPICS
IN SECURITY   1.0 UNIT

Class hours: 1.0 Lecture/1.0 Laboratory
This course is designed to provide basic information on the latest technological developments in the information security field. Students will learn about the latest security issues in the enterprise network as well as various tactics and tools to counter those security threats.
Transfer Credit: CSU

CIS 169D
SPECIAL TOPICS
IN SECURITY   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This course is designed to provide in-depth training on the latest software and hardware technology used in the enterprise network security field. Students will learn about and research the latest security threats in an organization. They will also explore various tactics and tools to counter those security threats and implement them in the enterprise network.
Transfer Credit: CSU

CIS 170A
NETWORKING
FUNDAMENTALS   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This is a survey course about the computer networking and telecommunications industry. Topics covered include the seven layers of the Open Systems Interconnection Model (OSI), network architectures, internetworking, and telecommunications.
Transfer Credit: CSU

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CIS 170B
NETWORK +
CERTIFICATION   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This course offers training in the knowledge and skills required by the CompTIA (the Computer Technology Industry Association) for its Network + certification. Topics include network fundamentals, local area network implementation, basic systems administration and various network protocols and devices.
Transfer Credit: CSU

CIS 170E
ROUTER CONFIGURATIONS
AND PROTOCOL   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Prerequisite: CIS 170A (formerly CIS 70A) or equivalent with a grade of "C" or higher or "Pass" or appropriate work experience.
This is the second course of four on Cisco networking technologies. It covers the OSI reference model, routers and their use, router components, router start-up and setup, configurations, and the Cisco Internetworking Operating System (IOS).
Transfer Credit: CSU

CIS 170F
ADVANCED SWITCHING
AND ROUTING   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Prerequisite: CIS 170E (formerly CIS 70E) or equivalent with a grade of "C" or higher or "Pass" or appropriate work experience.
This is the third in a series of courses that prepares students for certification as a Cisco Certified Network Associate (CCNA). This class covers LAN (Local Area Networks), Switching, VLANs (Virtual Local Area Networks) LAN design, IGRP (Interior Gateway Routing Protocol), Access lists, and Novell IPX.
Transfer Credit: CSU

CIS 170G
WIDE AREA NETWORKS   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Prerequisite: CIS 170E (formerly CIS 70E) or equivalent with a grade of "C" or higher or "Pass" or appropriate work experience.
This is the fourth in a series of courses that prepares students for certification as a Cisco Certified Network Associate

(CCNA). It covers Wide Area Network (WAN) design, Point-to-Point Protocol (PPP), Integrated Services Digital Network (ISDN), Frame Relay, and CCNA exam review.
Transfer Credit: CSU

CIS 170H
TCP/IP FUNDAMENTALS   3.0 UNITS

Class hours: 3.0 Lecture
Recommendation: A knowledge of Web browser and e-mail applications.
This course offers an overview of the most widely-used networking architecture in the networking industry: Transport Control Protocol/Internet Protocol (TCP/IP). Students will learn the underlying applications, components, and protocols of TCP/IP and its necessary link to the Internet, and how to identify TCP/IP layers, components, and functions. Navigation tools, TCP/IP services and troubleshooting methodologies are also reviewed. Topics include usage of TCP/IP applications, structure of TCP/IP and IP routing, TCP/IP addressing and subnetting, how TCP/IP addresses are discovered and used in computer networks, IP routing and router usage, and troubleshooting a TCP/IP network.
Transfer Credit: CSU

CIS 170I
CISCO NETWORK
SECURITY   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: A knowledge of Cisco Internet Operating Systems (IOS) or appropriate work experience.
This course aims to help students develop a detailed understanding of network security principles as well as tools available. It will assist students in developing the skills necessary to design and support network security. The course content matches the objectives in Cisco Certified Network Associate (CCNA) Security certification.
Transfer Credit: CSU

CIS 170K
INTRODUCTION
TO WIRELESS
NETWORKING   3.0 UNITS

Class hours: 3.0 Lecture
This is an introductory course on fundamental concepts of wireless networking. It covers the technical foundation of wireless communications and various protocols used in current

wireless applications. Topics include Wireless Application Protocol (WAP), Bluetooth, cellular telephony, wireless local area networks (WLANs), satellite communications, and the Global Positioning System (GPS).
Transfer Credit: CSU

CIS 170L
CYBERSECURITY
FUNDAMENTALS   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 170A or equivalent with a grade of "C" or higher or "Pass".
This is an introductory course on fundamentals of information security. It provides a comprehensive overview of communication security, infrastructure security, cryptography, operational/organizational security, disaster recovery, business continuity, as well as computer forensics. The contents also map to the Security+ certification exam by Computing Technology Industry Association (CompTIA)
Transfer Credit: CSU

CIS 170P
INTRODUCTION TO
ETHICAL HACKING   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 170A with a grade of "C" or higher or "Pass" or a knowledge of networking concepts or related work experience.
This course introduces students to ethical hacking, which is used to help organizations to identify weaknesses in their information infrastructure and take preemptive measures against malicious attacks. Ethical hackers have to be bound by legal limits and high ethical standards in information security. Students will learn both common hacking techniques and countermeasures to protect information assets.
Transfer Credit: CSU

CIS 170R
COMPUTER AND
DIGITAL FORENSICS   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 58A with a grade of "C" or higher or "Pass"or a knowledge of computer operating systems or related work experience.
This course covers both theoretical concepts and practical skills in digital forensics. Students will learn

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various techniques and processes in detecting, collecting, preserving and analyzing digital evidence in the event of cyberattacks, or in cases of law enforcement investigations. This course is part of the cybersecurity program.
Transfer Credit: CSU

CIS 170S
NETWORK DEFENSE   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 170A with a grade of "C" or higher or "Pass" or a knowledge of networking concepts or related work experience.
This course introduces students to concepts and tools in network defense. Topics cover protocol analyzers, Intrusion Detection Systems (IDS), Intrusion Prevention Systems (IPS), firewalls, Virtual Private Networks (VPN), Network Address Translation (NAT), proxy servers and the latest network defense tools. This course is part of the cybersecurity certificate program.
Transfer Credit: CSU

CIS 171A
INTRODUCTION TO CLOUD COMPUTING   3.0 UNITS

Class Hours: 3.0 Lecture/1.0 Laboratory
This course introduces cloud computing which shifts information systems from on-premises computing infrastructure to highly scalable internet architectures. The course provides a solid foundation of cloud computing technologies and provides students with the understanding required to effectively evaluate and assess the business and technical benefits of cloud computing and cloud applications. Students analyze a variety of cloud services (storage, servers and software applications) and cloud providers. Case studies will be used to examine various industry cloud practices and applications. The course also surveys cloud careers and discusses industry demand for cloud skills.
Transfer Credit: CSU

CIS 171B
AMAZON WEB SERVICES-DATA STORAGE   3.0 UNITS

Class Hours: 3.0 Lecture/1.0 Laboratory
This course introduces Amazon Web Services (AWS) data storage services. The course will cover both an introduction of AWS database technologies and AWS block and object-based storage services. A range of AWS SQL and NoSQL database technologies will be covered, including the principles of database design and management. In addition, AWS block and object-based storage options will be introduced which includes the principles of block and object-based storage options and the various use case scenario for AWS data storage services.
Transfer Credit: CSU

CIS 171C
AMAZON WEB SERVICES-COMPUTING SERVICES   3.0 UNITS

Class Hours: 3.0 Lecture/1.0 Laboratory
This course introduces Amazon Web Services (AWS) computing related services. Students will learn the core computing technologies offered by Amazon Web Services. The computing services students will learn will follow the computing models: Infrastructure as a Service, Platform as a Service, Function as a Service or Micro-services. Students will learn how to set up and manage computing services, auto scale computing services and configure computing load balancing. You will also learn how to code auto deployment scripts for the AWS infrastructure.
Transfer Credit: CSU

CIS 171D
AMAZON WEB SERVICES-SECURITY   3.0 UNITS

Class Hours: 3.0 Lecture/1.0 Laboratory
This course explores Amazon Web Services (AWS) security at both the AWS services layer and Amazon data center infrastructure layer. This course will go over how Amazon Web Services implemented security measures in their global data center infrastructure. The course will also look at the AWS security shared responsibility model and how to use Amazon security and monitoring tool to ensure security in an AWS cloud infrastructure. The course will provide an understanding of how AWS security tools can provide hardware, service, network and user activity monitoring, key management services, server and application firewall services and an introduction to implementing private and public subnets.
Transfer Credit: CSU

CIS 180
PROGRAMMING IN C/C++   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Prerequisite: CIS 103 or equivalent with a grade of "C" or higher or "Pass".
This course introduces C and C++ programming language structures. Topics include data types, operators, program control flow, arrays, functions, pointers, character strings, structures and pointers. This course also includes an introduction to object oriented programming design.
Transfer Credit: CSU; UC

CIS 181
PYTHON PROGRAMMING   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Prerequisite: CIS 103 or equivalent with a grade of "C" or higher or "Pass".
This course introduces the Python programming language, its syntax, structures and libraries. It develops object-oriented design and programming techniques and includes practice in robustness and transparency in software development while writing object-oriented console applications and introducing the fundamentals of graphical user interface (GUI) tools.
Transfer Credit: CSU

CIS 183
JAVA PROGRAMMING   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Prerequisite: CIS 103 or equivalent with a grade of "C" or higher or "Pass".
This course introduces the Java programming language, its syntax, structures and libraries. It develops object-oriented design and programming techniques and includes practice in robustness and transparency in software design while writing object-oriented console and graphical user interface (GUI) applications. Students will become familiar with the Java class hierarchy provided with the Java Development Kit (JDK) Standard Edition (Java SE). This course is not open to students with credit in CIS 182.
Transfer Credit: CSU; UC

CIS 185
DISCRETE STRUCTURES 3.0 UNITS

Class hours: 3.0 Lecture/1.0 Laboratory
Prerequisite: CIS 183 or equivalent with a grade of "C" or higher or "Pass".

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This course is an introduction to the discrete structures used in computer science with an emphasis on their applications. Topics covered include functions, relations and sets, basic logic, proof techniques, basics of counting, graphs and trees, and discrete probability. This course is not open to students with credit in MATH 160.
Transfer Credit: CSU; UC

CIS 189A
SPECIAL TOPICS IN
SOFTWARE DEVELOPMENT 1.0 UNIT

Class hours: 1.0 Lecture
This course introduces students to new software application designs in the information technology industry. The focus of the course includes programming language structure, programming implementation, and application design.
Transfer Credit: CSU; UC credit determined after admission.

CIS 189B
SPECIAL TOPICS
IN SOFTWARE
DEVELOPMENT 2.0 UNITS

Class hours: 2.0 Lecture
This course introduces students to new software application designs in the information technology industry. The focus of the course includes programming language structure, programming implementation, and application design.
Transfer Credit: CSU; UC credit determined after admission.

CIS 189C
SPECIAL TOPICS
IN SOFTWARE
DEVELOPMENT 3.0 UNITS

Class hours: 3.0 Lecture
This course introduces students to new software application designs in the information technology industry. The focus of the course includes programming language structure, programming implementation, and application design.
Transfer Credit: CSU; UC credit determined after admission.

CIS 189D
SPECIAL TOPICS
IN SOFTWARE
DEVELOPMENT 3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 103 or equivalent with a grade of "C" or higher or "Pass".
This is a software development course designed to acquaint the student with new languages in the information technology industry. The course will focus on programming language structure, programming implementation, and application design.
Transfer Credit: CSU; UC credit determined after admission.

CIS 200A
APPLE MAC OS
SUPPORT ESSENTIALS 3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: A knowledge of computer operating systems or appropriate work experience.
This course is to prepare desktop specialists, service technicians for Apple computers by providing comprehensive coverage on installation, administration, and support of Macintosh Operating Systems (Mac OS). The topics include system configurations, user account management, file systems, network services and configuration, and security. The content of this course matches the objectives of the Apple Certified Support Professional (ACSP) certification.
Transfer Credit: CSU

CIS 201
SYSTEMS ANALYSIS
AND DESIGN 3.0 UNITS

Class hours: 3.0 Lecture/1.0 Laboratory
This course is a detailed study of business systems analysis and design theory and application techniques. It includes interviewing techniques, systems functions, surveys, diagramming, analysis, design, and testing. The systems development life cycle, structured design and object-oriented design methodologies will be studied. Attention is given to the role of the systems analyst within the business environment.
Transfer Credit: CSU

CIS 207
DATABASE
DESIGN AND SQL 3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 155 or equivalent with a grade of "C" or higher or "Pass".
This course covers the concepts of designing, creating, and accessing relational data base management systems (DBMS). SQL (Structure Query Language) is utilized to create, modify, and query multitable databases and produce output.
Transfer Credit: CSU

CIS 208A
ORACLE SQL
AND PL/SQL 3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 103 and CIS 155 or equivalent with grade of "C" or higher or "Pass" or appropriate work experience.
This course covers the concepts of Structured Query Language (SQL) in the SQL *Plus environment, and Oracle's Procedural Language/Structured Query Language (PL/SQL) programming languages for working with relational databases. The students will learn the creation of database objects and the storage, retrieval, and manipulation of data using the Oracle database management system.
Transfer Credit: CSU

CIS 211A
SPECIAL TOPICS
IN DATABASE 1.0 UNIT

Class hours: 1.0 Lecture
This course introduces students to recent advancements of database systems in information technology. The focus of this course will be database administration, programming, and security. The specific focus of a particular offering will be decided by the course instructor and announced in the Schedule of Classes.
Transfer Credit: CSU

CIS 211B
SPECIAL TOPICS
IN DATABASE 2.0 UNITS

Class hours: 2.0 Lecture
This course introduces students to recent advancements of database systems in information technology. The focus of this course will be database

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administration, programming, and security. The specific focus of a particular offering will be decided by the course instructor and announced in the Schedule of Classes.
Transfer Credit: CSU

CIS 211C
SPECIAL TOPICS
IN DATABASE   3.0 UNITS

Class hours: 3.0 Lecture
This course introduces students to recent advancements of database systems in information technology. The focus of this course will be database administration, programming, and security. The specific focus of a particular offering will be decided by the course instructor and announced in the Schedule of Classes.
Transfer Credit: CSU

CIS 212
INTRODUCTION TO
MICROSOFT WINDOWS
ADMINISTRATION   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 58A or equivalent with a grade of "C" or higher or "Pass".
This is a course for system administrators who are responsible for installing and administrating networks based on the current Windows operating systems. Students will learn how to install, configure, and optimize the current Windows operating systems, including network inter-operability and troubleshooting.
Transfer Credit: CSU

CIS 213A
MICROSOFT WINDOWS
ACTIVE DIRECTORY
SERVICES   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 212 or equivalent with a grade of "C" or higher or "Pass" or appropriate work experience.
This course provides an overview of Microsoft Windows Active Directory Services, used in the latest Microsoft network operating systems. It helps students develop knowledge and skills to install, configure, and administer Windows 2000 Active Directory Services, implement Group Policy, and perform the Group Policy-related tasks that are required to centrally manage users and computers. Students learn to set up and administer domain

user accounts and groups, delegate administrative control of Active Directory objects in Windows 2000, create and manage trees and forests in a Windows 2000 network, administer forest-wide resources, manage Active Directory replication and operation masters, manage and restore the Active Directory database, and implement an Active Directory infrastructure. The course also prepares students for the Microsoft Certified Professional (MCP) Exam 70-217- a core requirement on the Windows 2000 Microsoft Certified Systems Engineer (MCSE) track.
Transfer Credit: CSU

CIS 213B
MICROSOFT
ADVANCED NETWORK
INFRASTRUCTURE   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This course provides students with the information and skills needed to develop a plan for a network infrastructure based on Microsoft Windows server operating systems. Topics mainly focus on the designing aspects of various network services that can be provided by the server operating systems in areas such as Internet Protocol (IP) address assignments, name resolutions, IP routing, server clustering, and network infrastructure security. It also covers the objectives required by current Microsoft certifications, such as Microsoft Certified System Administrator (MCSA), Microsoft Certified System Engineer (MCSE), Microsoft Certified Technology Specialist (MCTS), and Microsoft Certified Information Technology Professional (MCITP).
Transfer Credit: CSU

CIS 213F
MICROSOFT
WINDOWS SERVER
ADMINISTRATION   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This course provides the knowledge required by system administrators, network administrators, and IT (Information Technology) professionals who implement, manage, and troubleshoot network and server environments based on the latest Microsoft Windows® platform. It offers up-to-date information on core system administration topics such as Active Directory services, security, disaster planning and recovery, and

interoperability with NetWare and Unix. It includes information on Microsoft Internet Security and Acceleration (ISA) Server and scripting. In addition, this course prepares students for a core Microsoft certification exam that will lead to such certifications as the Microsoft Certified System Engineer (MCSE), Microsoft Certified System Administrator (MCSA), Microsoft Certified Technology Specialist (MCTS), and Microsoft Certified Information Technology Professional (MCITP).
Transfer Credit: CSU

CIS 213G
MICROSOFT
EXCHANGE SERVER
ADMINISTRATION   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 212B or equivalent with a grade of "C" or higher or "Pass".
This course is to provide the knowledge required by System Administrators, Network Administrators, and IT (Information Technology) professionals who implement, manage and troubleshoot the Microsoft Exchange server. These skills are generally required in medium to very large computing environments that typically have multiple physical locations, mixed client connection protocols, and Internet messaging connectivity. In addition, this course is part of the Microsoft Certified Systems Engineer (MCSE) certification program series.
Transfer Credit: CSU

CIS 213H
MICROSOFT
WINDOWS SECURITY   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 212B or equivalent with a grade of "C" or higher or "Pass".
This course will provide training in tools and procedures recommended by the security industries for the System Administrators, Network Administrators, and Information Technology (IT) professionals who design, implement, and manage the Microsoft Windows network environment.
Transfer Credit: CSU

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CIS 213K
DESIGNING WINDOWS ACTIVE DIRECTORY AND NETWORK INFRASTRUCTURE   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
This course will help students develop skills and knowledge necessary to design an organization's active directory and network infrastructure. In addition, this course will prepare students for a core for the Microsoft Certified Systems Engineer (MCSE) certification.
Transfer Credit: CSU

CIS 214
UNIX AND LINUX OPERATING SYSTEMS   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: Knowledge of one operating system.
This course introduces UNIX® and Linux workstations. It develops a deeper understanding of operating systems, their functions and services. It provides practical familiarity with UNIX® and Linux hosts and the rich set of tools they provide to power users, operating systems specialists, network engineers, and programmers. Students will learn the power of robust, single-tasked utilities and their coordination into cohesive, productive tool-chains. This course fulfills certificate, AA, and transfer requirements. This course is a prerequisite or elective to all certification tracks. This course is generally applicable to all proprietary UNIX® implementations as well as open source Linux distributions and FreeBSD, including its various incarnations such as Mac OS X.
Transfer Credit: CSU

CIS 231
COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Prerequisite: CIS 180 or CIS 183 or equivalent with a grade of "C" or higher or "Pass.".
This course provides a detailed coverage of microcomputer architecture and instruction sets and how to use them to design and write assembly language programs. Topics will cover principles of assembly programming including functions, stacks, recursion, macros, input/output devices, precision arithmetic, and logic design. This course is not open to students with credit in CIS 230.
Transfer Credit: CSU; UC

CIS 271
COMPUTER AND INFORMATION SCIENCES OCCUPATIONAL WORK EXPERIENCE   1.0 UNIT

Class hours: 1.0 Work Experience
Class hours: 1 hr/wk coordination class.
One unit of Computer and Information Sciences Occupational Work Experience requires 60 non-paid hours of work or 75 paid hours of work per semester.
Work Experience/Career Internship provides the opportunity for students to apply skills and knowledge learned in the classroom to related experiences on the job/training site. The aim of the course is to assist students in expanding specific job skills. In the process of doing so, it creates greater communication with increased understanding between the student/workers, the college, and the employer/trainers. First semester students meet with their instructors for a minimum of one hour per week. Students also pursue a program of self-evaluation to determine individual job weaknesses and strengths. Semester projects that relate to their major and job skills must be completed on the job/training site. Second, third, and fourth semester students must secure departmental approval before enrolling. Students will meet weekly with the instructor until their participatory assignments and semester work projects have been approved. Work experience courses may be taken for a maximum of 8 units per semester. The total work experience units taken by a student may not exceed 16 units.
Transfer Credit: CSU

CIS 272
COMPUTER AND INFORMATION SCIENCES OCCUPATIONAL WORK EXPERIENCE   2.0 UNITS

Class hours: 1.0 Work Experience
Class hours: 1 hr/wk coordination class.
Two units of Computer and Information Sciences Occupational Work Experience require 120 non-paid hours of work or 150 paid hours of work per semester.
Work Experience/Career Internship provides the opportunity for students to apply skills and knowledge learned in the classroom to related experiences on the job/training site. The aim of the course is to assist students in expanding specific job skills. In the process of doing so, it creates greater communication with increased understanding between the student/workers, the college, and the employer/trainers. First semester students meet with their instructors for a minimum of one hour per week. Students also pursue a program of self-evaluation to determine individual job weaknesses and strengths. Semester projects that relate to their major and job skills must be completed on the job/training site. Second, third, and fourth semester students must secure departmental approval before enrolling. Students will meet weekly with the instructor until their participatory assignments and semester work projects have been approved. Work experience courses may be taken for a maximum of 8 units per semester. The total work experience units taken by a student may not exceed 16 units.
Transfer Credit: CSU

CIS 273
COMPUTER AND INFORMATION SCIENCES OCCUPATIONAL WORK EXPERIENCE   3.0 UNITS

Class hours: 1.0 Work Experience
Class hours: 1 hour/week coordination class.
Three units of Computer and Information Sciences Occupational Work Experience require 180 non-paid hours of work or 225 paid hours of work per semester.
Work Experience/Career Internship provides the opportunity for students to apply skills and knowledge learned in the classroom to related experiences on the job/training site. The aim of the course is to assist students in expanding specific job skills. In the process of doing so, it creates greater communication with increased understanding between the student/workers, the college, and the employer/trainers.
First semester students meet with their instructors for a minimum of one hour per week. Students also pursue a program of self-evaluation to determine individual job weaknesses and strengths. Semester projects that relate to their major and job skills must be completed on the job/training site.

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Second, third, and fourth semester students must secure departmental approval before enrolling. Students will meet weekly with the instructor until their participatory assignments and semester work projects have been approved. Work experience courses may be taken for a maximum of 8 units per semester. The total work experience units taken by a student may not exceed 16 units.
Transfer Credit: CSU

CIS 274
COMPUTER AND INFORMATION SCIENCES OCCUPATIONAL WORK EXPERIENCE   4.0 UNITS

Class hours: 1.0 Work Experience
Class hours: 1 hour/week coordination class.
Four units of Computer and Information Sciences Occupational Work Experience require 240 non-paid hours of work or 300 paid hours of work per semester.
Work Experience/Career Internship provides the opportunity for students to apply skills and knowledge learned in the classroom to related experiences on the job/training site. The aim of the course is to assist students in expanding specific job skills. In the process of doing so, it creates greater communication with increased understanding between the student/workers, the college, and the employer/trainers.
First semester students meet with their instructors for a minimum of one hour per week. Students also pursue a program of self-evaluation to determine individual job weaknesses and strengths. Semester projects that relate to their major and job skills must be completed on the job/training site.
Second, third, and fourth semester students must secure departmental approval before enrolling. Students will meet weekly with the instructor until their participatory assignments and semester work projects have been approved. Work experience courses may be taken for a maximum of 8 units per semester. The total work experience units taken by a student may not exceed 16 units.
Transfer Credit: CSU

CIS 280
OBJECT-ORIENTED PROGRAMMING IN C++   3.0 UNITS

Class hours: 3.0 Lecture
Recommendation: Strongly recommend CIS 180 or equivalent with a grade of "C" or higher or "Pass".
This is a course in Object-Oriented Programming (OOP) using the C++ programming language. Topics presented include abstract data types, objects and classes, operator overloading, inheritance, constructors and destructors, pointers, member functions, virtual functions, the theory of object-oriented programming, and the techniques of object-oriented design.
Transfer Credit: CSU; UC

CIS 280X
OBJECT-ORIENTED PROGRAMMING IN C++   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: Strongly recommend CIS 180 or equivalent with a grade of "C" or higher or "Pass".
This is a course in Object-Oriented Programming (OOP) using the C++ programming language. Topics presented include abstract data types, objects and classes, constructors, destructors, pointers, virtual functions, operator overloading, inheritance, polymorphism, exceptions, Standard Template Library (STL), the theory of object-oriented programming, and the techniques of object-oriented design. This course is not open to students who have received credit in CIS 280.
Transfer Credit: CSU; UC

CIS 282
ADVANCED JAVA PROGRAMMING   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 183 or equivalent with a grade of "C" or higher or "Pass".
This course covers the implementation of advanced program designs with the tools available in the Java programming language. After fundamentals are reviewed, advanced topics will be presented, including the graphical user interface (GUI) for applications, 2D graphics, multimedia, multithreading for synchronized concurrency, and client-server models for networking and database connectivity.
Transfer Credit: CSU

CIS 285A
ASP.NET PROGRAMMING 3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: CIS 162 and CIS 286 or equivalents with grades of "C" or higher or "Pass".
This course covers the different approaches for creating server-side scripts using Active Server Pages.NET (ASP). The student will learn how to build, implement, and execute scripts that create fully-functional Web applications.
Transfer Credit: CSU

CIS 286
SOFTWARE DEVELOPMENT WITH C#   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: Knowledge of one object-oriented programming language.
This course provides students with the knowledge and skills to develop programs useful for a broad range of Windows based and online applications using C# programming language. The course covers object-oriented design, graphical user interface, networking, threading, web services, collections and basic web database programming.
Transfer Credit: CSU

CIS 288
MOBILE APPLICATION DEVELOPMENT   3.5 UNITS

Class hours: 3.0 Lecture/2.0 Laboratory
Recommendation: Knowledge of one object-oriented programming language (such as C++, Java, or C#) or related work experience.
This course explores the principles and tools involved in the design and construction of applications for mobile devices. The course covers designing user interfaces, processing user input and events, retrieving and storing data, communicating via the Internet, and deploying applications.
Transfer Credit: CSU

CIS 292
DATA STRUCTURES   3.0 UNITS

Class hours: 3.0 Lecture
Prerequisite: CIS 183 or CIS 280X or equivalent of either course with a grade of "C" or higher or "Pass" or appropriate work experience.
This course introduces the structured representation of data in computer systems and programming languages. It teaches the creation of structures that

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maintain complex data relationships in order to access, search through, and modify that data in an organized and efficient manner. Students learn to analyze the time and size efficiency tradeoffs of the various data structures and access algorithms. Techniques are presented for organizing data into useful types of lists, trees, stacks, and queues using array-based and linked structures. Students develop efficient algorithms to order and access that data using iteration and recursion to solve complex, real-world problems. Other advanced data structures such as self-balancing trees and graphs are designed and evaluated. This course is required for university transfer in computer science.
Transfer Credit: CSU; UC

CIS 298
DIRECTED STUDIES   1.0 UNIT

Class hours: 3.0 Independent Study
A course to provide opportunity for individual research and field projects under the direction of a faculty member in a given department. With the guidance of the faculty member, students prepare and carry out a written learning agreement describing the purposes and outcomes of the project. Students should expect to meet with the supervising faculty member one to two hours each week for conferences. Credit is based upon the number of hours in the semester expected to complete the project (1 unit for 54 hours). This course may be taken a maximum of 2 times. For selected disciplines, UC transfer credit may be possible after admission to a UC campus, pending review of appropriate course materials by UC staff. See a counselor for an explanation.
Transfer Credit: CSU

CIS 299
DIRECTED STUDIES   2.0 UNITS

Class hours: 6.0 Independent Study
A course to provide opportunity for individual research and field projects under the direction of a faculty member in a given department. With the guidance of the faculty member, students prepare and carry out a written learning agreement describing the purposes and outcomes of the project. Students should expect to meet with the supervising faculty member one to two hours each week for conferences. Credit is based upon the number of hours in

the semester expected to complete the project (2 units for 108 hours). This course may be taken a maximum of 2 times. For selected disciplines, UC transfer credit may be possible after admission to a UC campus, pending review of appropriate course materials by UC staff. See a counselor for an explanation.
Transfer Credit: CSU

COSMETOLOGY

(Technology Division)

COS 53
ADVANCED COSMETOLOGY
MANIPULATION   7.5 UNITS

Class hours: 3.3 Lecture/9.8 Laboratory
Prerequisite: COS62B or COS 70C with a grade of "C" or higher or "Pass".
This is an advanced course designed to permit the student to complete 1600 hours necessary to take the State Board of Cosmetology examination. It provides an opportunity for the student to continue developing manipulative skills in hairstyling, hair coloring, permanent waving, chemical straightening, scalp treatments, facials, waxing, manicuring, pedicuring, and thermal styling.

COS 54
INTRODUCTORY
ESTHETICIAN   11.0 UNITS

Class hours: 6.0 Lecture/15.0 Laboratory
Prerequisite: ENGL 100 or ENGL 100S or equivalent with a grade of "C" or higher or "Pass" OR completion of the English assessment/placement process with eligibility for ENGL 100 or ENGL 100S.
This is an introductory course designed to develop basic skills and theoretical knowledge necessary to enter the licensed esthetician vocation. Students develop knowledge in theories of cosmetic chemistry, products, and their use and effect on skin. Students' knowledge and ability are achieved in a minimum of 300 hours, through lecture, demonstrations and laboratory in a salon atmosphere.

COS 54A
ADVANCED ESTHETICIAN 11.0 UNITS

Class hours: 6.0 Lecture/15.0 Laboratory
Prerequisite: COS 54 or equivalent with a grade of "C" or higher or "Pass".
This class is an advanced portion of the esthetic program. It develops skills in

electrical modalities, depilatory waxing, paraffin waxing, advanced massage techniques, and corrective make-up. Students develop skills in selecting appropriate facial treatments. The students' ability and knowledge are to be achieved in a minimum of 300 hours through lecture and demonstration by working in a salon atmosphere.

COS 55
ESTHETICS CROSSOVER   6.5 UNITS

Class hours: 3.4 Lecture/6.8 Laboratory
Prerequisite: COS61B or COS 70B with a grade of "C" or higher or a cosmetology license or proof of completion of a cosmetology program, and ENGL 100 or ENGL 100S or equivalent with a grade of "C" or higher or "Pass" OR completion of the English assessment/placement process.
This is an esthetician crossover course designed to develop esthetic skills and theoretical knowledge necessary to obtain an esthetician license. Students will enhance theoretical and practical knowledge of esthetic chemistry, procedures, products, facial machines and their use and effects on skin. Students will achieve theoretical and practical knowledge in a minimum of 200 hours, through lecture, demonstrations and laboratory in a salon atmosphere.

COS 60A
INTRODUCTORY
COSMETOLOGY I   11.0 UNITS

Class hours: 6.0 Lecture/15.0 Laboratory
Prerequisite: ENGL 100 or ENGL 100S or equivalent with a grade of "C" or higher or "Pass" OR completion of the English assessment/placement process.
This is an introductory course in the technical and related theory and manipulative skills pertaining to the field of cosmetology. It is designed to acquaint the student with, and to develop their ability to perform the basic skills in hairstyling, haircutting, and permanent waving. Emphasis will be placed on the Cosmetology Act, State Board Rules and Regulations, safety, sanitation, anatomy, and chemistry as they relate to the cosmetology profession.

COS 60B
INTRODUCTORY
COSMETOLOGY II   11.0 UNITS

Class hours: 6.0 Lecture/15.0 Laboratory
Prerequisite: COS 60A with a grade of "C" or higher or "Pass".

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