

## COMPUTER AND INFORMATION SYSTEMS

### Natural and Applied Sciences Division

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<http://www.cabrillo.edu/programs>

### Computer and Information Systems

The Computer and Information Systems Department offers two programs: Computer Networking and System Administration (CNSA) and Computer Support Specialist (CSS). Both programs are designed to help students acquire the knowledge and skills necessary to work in computer technical support positions and prepare for industry certification exams. Additionally, the CNSA program offers an A.S. Degree which meets the transfer requirements for CSUMB, a Certificate of Achievement and skills certificates. The CSS program offers an A.S. Degree, a Certificate of Achievement, and skills certificates. Please refer to the CNSA and CSS programs for details.

## COMPUTER NETWORKING AND SYSTEM ADMINISTRATION

### Natural and Applied Sciences Division

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### Computer Networking and System Administration

#### Program Description:

The Computer Networking and System Administration program is intended to prepare students to work in the Information Technology (IT) industry in general, and more specifically in computer networking and system administration. Courses include the underlying networking concepts and theory, administering the network infrastructure including the Cisco Systems CCNA/CCNP courses, system and network administration using UNIX/Linux and Microsoft operating systems, network security, network management, and emerging technologies. Various certificates and degree options are available, including courses that transfer to four-year universities for those students pursuing a Bachelor's Degree.

### A.S. Degree: Computer Networking and System Administration

#### A.S. General Education

21 Units

#### Core Courses (25 units)

CIS 81	Networking Fundamentals and Theory (Cisco CCNA 1) . . . . .	4
CIS 82	Introduction to Routing Technologies and Theory (Cisco CCNA 2) . . . . .	4
CIS 90	Introduction to UNIX/Linux . . . . .	3
CIS 172	Introduction to Operating Systems . . . . .	4
CIS 175	Fundamentals of Computer Security . . . . .	3
CIS 194	Microsoft Windows Client Administration . . . . .	3

#### And one of the following courses:

CS 11	Introduction to Programming Concepts and Methodology, C++ . . . . .	4
CS 12J	Introduction to Programming Concepts and Methodology, Java . . . . .	4
CS 19	C++ Programming . . . . .	4
CS 20J	Java Programming . . . . .	4
CIS 130	UNIX/Linux Shell Programming . . . . .	4
CIS 131	Perl Programming in a Unix Environment . . . . .	4
CIS 132	Introduction to Internet Programming . . . . .	4

#### Completion of one or more of the Skills Certificates and Approved Electives (14 units)

CS 12AL	Intro to Programming for the Non-Major . . . . .	4
CIS 60A-ZZ	Special Topics in Computer and Information Systems . . . . .	0.5 - 4
CIS 83	Switched Networks and WANs (Cisco CCNA 3 & 4) . . . . .	4
CIS 99C	Career Work Experience Education . . . . .	1 - 4
CIS 146	CCNA Security . . . . .	4
CIS 160A-Z	Special Topics in Computer and Information Systems . . . . .	0.5 - 4
CIS 164	Introduction to Managing and Securing a Web Server . . . . .	3
CIS 170	Introduction to Computer Hardware and Software . . . . .	4
CIS 185	Advanced Routing (Cisco CCNP ROUTE) . . . . .	4
CIS 187	Implementing IP Switching (Cisco CCNP SWITCH) . . . . .	4
CIS 188	Maintaining and Troubleshooting IP Networks . . . . .	4
CIS 191AB	UNIX/Linux Installation, Configuration and Administration . . . . .	4
CIS 191A	UNIX/Linux Installation and Configuration . . . . .	2
CIS 191B	UNIX/Linux System Administration . . . . .	2
CIS 192AB	UNIX/Linux Network Administration . . . . .	4
CIS 192A	UNIX/Linux TCP/IP Administration . . . . .	2
CIS 192B	UNIX/Linux Network Services . . . . .	2
CIS 193AB	UNIX/Linux Security Administration . . . . .	4
CIS 193A	UNIX/Linux Host Security Basics . . . . .	2
CIS 193B	UNIX/Linux Network Security Basics . . . . .	2
CIS 195	Microsoft Windows Server Administration (Semester 1) . . . . .	4
CIS 196	Microsoft Windows Network Administration (Semester 2) . . . . .	4

**Total Units**

**60**

**Certificate of Achievement: Computer Networking and System Administration**

**Core Courses (25 units)**

CIS 81	Networking Fundamentals and Theory (Cisco CCNA 1) . . . . .	4
CIS 82	Introduction to Routing Technologies and Theory (Cisco CCNA 2) . . . . .	4
CIS 90	Introduction to UNIX/Linux . . . . .	3
CIS 172	Introduction to Operating Systems . . . . .	4
CIS 175	Fundamentals of Computer Security . . . . .	3
CIS 194	Microsoft Windows Client Administration . . . . .	3

**And one of the following courses:**

CS 11	Introduction to Programming Concepts and Methodology, C++ . . . . .	4
CS 12J	Introduction to Programming Concepts and Methodology, Java . . . . .	4
CS 19	C++ Programming . . . . .	4
CS 20J	Java Programming . . . . .	4
CIS 130	UNIX/Linux Shell Programming . . . . .	4
CIS 131	Perl Programming in a Unix Environment . . . . .	4
CIS 132	Introduction to Internet Programming . . . . .	4

**Required Courses\***

COMM 2	Group Discussion . . . . .	3
or		
COMM 10	Communication Process . . . . .	3
ENGL 1A/1AH/1AMC/1AMCH	. . . . .	3

**Total Units** **31**

*\*Either COMM 2 or COMM 10 is required and may be used to meet the A2: Critical Thinking requirement for General Education.*

**Skills Certificate: Cisco Certified Network Associate (CCNA)**

CIS 81	Networking Fundamentals and Theory (Cisco CCNA 1) . . . . .	4
CIS 82	Introduction to Routing Technologies and Theory (Cisco CCNA 2) . . . . .	4
CIS 83	Switched Networks and WANs (Cisco CCNA 3 & 4) . . . . .	4

**Total Units** **12**

**Skills Certificate: Cisco Certified Network Professional (CCNP)**

CIS 146	CCNA Security . . . . .	4
CIS 185	Advanced Routing (Cisco CCNP ROUTE) . . . . .	4
CIS 187	Implementing IP Switching (Cisco CCNP SWITCH) . . . . .	4
CIS 188	Maintaining and Troubleshooting IP Networks . . . . .	4

**Total Units** **16**

**Skills Certificate: Microsoft System Administration**

CIS 81	Networking Fundamentals and Theory (Cisco CCNA 1) . . . . .	4
CIS 194	Microsoft Windows Client Administration . . . . .	3
CIS 195	Microsoft Windows Server Administration (Semester 1) . . . . .	4
CIS 196	Microsoft Windows Network Administration (Semester 2) . . . . .	4

**Total Units** **15**

**Skills Certificate: UNIX/Linux System Administration**

**Required Courses**

CIS 90	Introduction to UNIX/Linux . . . . .	3
CIS 191A	UNIX/Linux Installation and Configuration . . . . .	2
CIS 191B	UNIX/Linux System Administration . . . . .	2

**Take 8 units from the following courses:**

CIS 130	UNIX/Linux Shell Programming . . . . .	4
or		
CIS 192A	UNIX/Linux TCP/IP Administration . . . . .	2
and		
CIS 192B	UNIX/Linux Network Services . . . . .	2
or		
CIS 193A	UNIX/Linux Host Security Basics . . . . .	2
and		
CIS 193B	UNIX/Linux Network Security Basics . . . . .	2

**Total Units** **15**

# COMPUTER SUPPORT SPECIALIST

## Natural and Applied Sciences Division

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## Computer Support Specialist

### Program Description:

The Computer Support Specialist program is designed to help students acquire the knowledge and skills necessary to work in computer technical support positions and prepare for industry certification exams. Students will be able to provide technical support, troubleshooting, training and documentation to internal and external customers. Courses include computer hardware, operating systems, common software utilities, fundamentals of networking and help desk concepts. An Associate in Science Degree, a Certificate of Achievement, and Skills Certificates are available in the areas of Comp TIA A+ Preparation, and Computer Support Technician 1. The following courses are recommended for potential Computer Support Specialist majors early in their academic career to help determine their interest in pursuing the major: CS 1 and CS 1L.

### A.S. Degree: Computer Support Specialist

**A.S. General Education** **21 Units**

#### Core Courses (26 units)

CIS 81	Networking Fundamentals and Theory (Cisco CCNA 1) . . . . .	4
CIS 90	Introduction to UNIX/Linux . . . . .	3
CIS 103	Technical Support and Troubleshooting . . . . .	4
CIS 170	Introduction to Computer Hardware and Software . . . . .	4
CIS 172	Introduction to Operating Systems . . . . .	4
CIS 194	Microsoft Windows Client Administration . . . . .	3
CIS 195	Microsoft Windows Server Administration (Semester 1) . . . . .	4

#### Completion of one or more of the Skills Certificates and Approved Electives (13 units)

CIS 60A-ZZ	Special Topics in Computer and Information Systems. . . . .	0.5 - 4
CIS 82	Introduction to Routing Technologies and Theory (Cisco CCNA 2) . . . . .	4
CIS 99C	Career Work Experience Education. . . . .	1 - 4
CIS 130	UNIX/Linux Shell Programming . . . . .	4
CIS 131	****Perl Programming in a Unix Environment . . . . .	4
CIS 132	Introduction to Internet Programming . . . . .	4
CIS 146	CCNA Security . . . . .	4
CIS 154	Introduction to Client/Server Relational Database Management Systems . . . . .	4
CIS 160A-Z	Special Topics in Computer and Information Systems. . . . .	0.5 - 4
CIS 164	Introduction to Managing and Securing a Web Server . . . . .	3
CIS 165PH	Introduction to Programming Database-Driven	

	Websites with PHP. . . . .	4
CIS 175	Fundamentals of Computer Security . . . . .	3
CIS 191AB	UNIX/Linux Installation, Configuration and Administration . . . . .	4
CIS 191A	UNIX/Linux Installation and Configuration . . . . .	2
CIS 191B	UNIX/Linux System Administration . . . . .	2
CIS 192AB	UNIX/Linux Network Administration . . . . .	4
CIS 192A	UNIX/Linux TCP/IP Administration. . . . .	2
CIS 192B	UNIX/Linux Network Services . . . . .	2
CIS 195	Microsoft Windows Server Administration (Semester 1) . . . . .	4
CIS 196	Microsoft Windows Network Administration (Semester 2) . . . . .	4
CS 11	Introduction to Programming Concepts and Methodology, C++ . . . . .	4
CS 12AL	Intro to Programming for the Non-Major. . . . .	4
CS 12J	Introduction to Programming Concepts and Methodology, Java. . . . .	4
CS 19	C++ Programming . . . . .	4
CS 20J	Java Programming. . . . .	4
CS 21	*Introduction to Data Structures and Algorithms. . . . .	4
CS 23	**Discrete Mathematics. . . . .	4
or		
MATH 23	**Discrete Mathematics. . . . .	4
CS 24	***Elementary Computer Organization . . . . .	4
DM 60A	Web Publishing 1: (X)HTML and CSS Level 1 . . . . .	3
DM 70	Web Design Basics Using Dreamweaver . . . . .	3
DM 101	Fundamentals of Macintosh Operating Systems3	
DM 160B	Web Publishing 2: Graphics and CSS Level 2 . . . . .	3

#### Electives:

(Any Course numbered 1-199). . . . . 3

**Total Units** **60**

*\*spring only; \*\*spring only, even years; \*\*\*fall only, even years;*

*\*\*\*\*summer only.*

### Certificate of Achievement: Computer Support Specialist

#### Core Courses (26 units)

CIS 81	Networking Fundamentals and Theory (Cisco CCNA 1) . . . . .	4
CIS 90	Introduction to UNIX/Linux . . . . .	3
CIS 103	Technical Support and Troubleshooting. . . . .	4
CIS 170	Introduction to Computer Hardware and Software . . . . .	4
CIS 172	Introduction to Operating Systems . . . . .	4
CIS 194	Microsoft Windows Client Administration . . . . .	3
CIS 195	Microsoft Windows Server Administration (Semester 1) . . . . .	4

#### Required Courses

COMM 2	Group Discussion. . . . .	3
or		
COMM 10	Communication Process . . . . .	3
ENGL 1A/1AH/1AMC/1AMCH. . . . .		3

**Total Units** **32**

*\*Either COMM 2 or COMM 10 is required and may be used to meet the A2: Critical Thinking requirement for General Education.*

*All skills certificates assume the successful completion of CS 1 and CS 1L or equivalent skills.*

**Skills Certificate: A+ Preparation**

CIS 170	Introduction to Computer Hardware and Software . . . . .	4
CIS 172	Introduction to Operating Systems . . . . .	4
CIS 194	Microsoft Windows Client Administration . . . . .	3
CIS 195	Microsoft Windows Server Administration (Semester 1) . . . . .	4
<b>Total Units</b>		<b>15</b>

**Skills Certificate: Computer Support Technician 1**

**Required Courses**

CIS 90	Introduction to UNIX/Linux . . . . .	3
or		
CIS 172	Introduction to Operating Systems . . . . .	4
CIS 103	Technical Support and Troubleshooting . . . . .	4
CIS 170	Introduction to Computer Hardware and Software . . . . .	4
CIS 194	Microsoft Windows Client Administration . . . . .	3
COMM 6	Listening . . . . .	1
<b>Total Units</b>		<b>15 - 16</b>

**Computer and Information Systems Courses**

**CIS 60A-ZZ**

**Special Topics in Computer and Information Systems**

0.5 - 4 units; 0.5 hour Lecture

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 4 times.

Investigates special selected areas of interest in computer and information systems not covered by regular *Catalog* offerings. The special areas will be announced, described, and given their own titles and letter designations in the *Schedule of Classes*. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

**CIS 81**

**Networking Fundamentals and Theory (Cisco CCNA 1)**

4 units; 4 hours Lecture, 5 hours Laboratory

Prerequisite: CIS 172 or concurrent enrollment, or familiarity with using a command line interface such as Unix/Linux or DOS, file management, a general understanding of the function of operating systems and familiarity with using the Windows operating system. MATH 254CM or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Presents networking protocols, standards, concepts, and terminology including Ethernet, ARP, ICMP, IP addressing, subnetting, switches, hubs, routers, TCP, UDP, OSI Model and other standards and protocols. First course in the Cisco Networking Academy CCNA curriculum which is a prerequisite for some of the MCSE/MCSA and Linux certification courses. Provides additional information on networking theory and protocols beyond that of the basic Cisco Networking Academy Semester 1 course, leading to a more detailed understanding of networking. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

**CIS 82**

**Introduction to Routing Technologies and Theory (Cisco CCNA 2)**

4 units; 4 hours Lecture, 5 hours Laboratory

Prerequisite: CIS 81.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Introduces routing technology, routing theory and router configuration including static routes, distance vector and link state routing theory, routing loop issues, VLSM, CIDR, and routing protocols such as RIPv1, RIPv2, EIGRP and Single Area OSPF. Second of four courses in the Cisco Networking Academy CCNA curriculum. Provides hands-on experience configuring Cisco routers, additional information on routing theory and protocols beyond that of the basic Cisco Networking Academy Semester 2 course, leading to a more detailed understanding of routing. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

**CIS 83**

**Switched Networks and WANs (Cisco CCNA 3 & 4)**

4 units; 4 hours Lecture, 5 hours Laboratory

Prerequisite: CIS 81.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Presents intermediate features of switching and WANs including VLANs, VTP, Inter-VLAN routing, STP, Frame Relay, HDLC, PPP, and ACLs. Combines semesters three and four of the Cisco Networking Academy CCNA curriculum. Hands-on experience using Cisco routers and also provides additional information on routing theory and protocols beyond that of the basic Cisco Networking Academy Semester 3 and 4 courses, leading to a more detailed understanding of routing, switching and Wide Area Networks. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

**CIS 90****Introduction to UNIX/Linux**

3 units; 3 hours Lecture, 3 hours Laboratory

Recommended Preparation: CS 1L or CIS 172; Eligibility for ENGL 100 and READ 100.

Provides a technical overview of the UNIX/Linux operating system, including hands-on experience with commands, files, and tools. Topics include basic UNIX/Linux commands, files and directories, text editing, electronic mail, pipes and filters, X Windows, shell environments and scripting. Required for students wishing to pursue the UNIX/Linux track leading to industry certification. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

**CIS 103****Technical Support and Troubleshooting**

4 units; 4 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 170 and CIS 172 or equivalent.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Teaches technical support skills for those seeking employment in the computer and information systems field. Topics include training in the various means of delivering technical support and tools for gathering, organizing and disseminating technical information, and help desk organization. Prepares students to provide technical assistance and training to computer users. May be offered in a Distance-Learning Format.

**CIS 130****UNIX/Linux Shell Programming**

4 units; 3 hours Lecture, 5 hours Laboratory

Prerequisite: CIS 90.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Presents an introduction to shell programming in a UNIX/Linux environment, and is designed for system administrators or technical users with little or no programming background. Topics include use of a text editor, the features of the Bash shell, variables, control structures, functions, signal handling, string manipulation, file access and basic programming style. May be offered in a Distance-Learning Format.

**CIS 131****Perl Programming in a Unix Environment**

4 units; 3 hours Lecture, 5 hours Laboratory

Prerequisite: CS 11 or CS 12J or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Introduces Perl programming in a Unix environment. Topics covered include the GNU Emacs text editor, variables, arrays, lists, control structures, basic input and output, regular expressions, text manipulation, functions and file access. May be offered in a Distance-Learning Format.

**CIS 132****Introduction to Internet Programming**

4 units; 3 hours Lecture, 5 hours Laboratory

Recommended Preparation: DM 60A; Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Repeatability: May be taken a total of 2 times.

Presents an introduction to Internet-related programming using primarily client-side scripting languages like JavaScript. Also introduces a server-side scripting language like PHP. Covers basic programming techniques including simple data types, control structures, functions and expressions. Topics include Web-based data collection, form verification, and Ajax. May be offered in a Distance-Learning Format.

**CIS 140W****Fundamentals of Wireless LANs**

4 units; 3 hours Lecture, 3 hours Laboratory

Prerequisite: CIS 81.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 4 times.

Covers the design, planning, implementing, operating and troubleshooting of Wireless LANs, including setup, 802.11(a, b, g) technologies, radio technologies, WLAN applications, WLAN security, vendor interoperability strategy and emerging wireless technologies. May be offered in a Distance-Learning Format.

**CIS 146****CCNA Security**

4 units; 4 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 82 and CIS 83 or equivalent knowledge.

Recommended Preparation: Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Repeatability: May be taken a total of 3 times.

Teaches network security principles including firewall technologies, AAA, intrusion prevention, securing LANs, implementing VPNs, and managing secure networks. May be offered in a Distance-Learning Format

**CIS 154****Introduction to Client/Server Relational Database Management Systems**

4 units; 3 hours Lecture, 5 hours Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Presents the installation, use, and administration of MySQL Client/Server Relational Database Management Installation along with the use and administration of a Client/Server Relational Database Management System. The design, creation, and administration of enterprise databases are covered, along with performance tuning, security and disaster recovery. Additional topics include: SQL (Structured Query Language), data types, functions, normalization, and a brief introduction to server-level programming and language interfaces for developing database-driven websites, emphasizing PHP systems. May be offered in a Distance-Learning Format.

## **CIS 160A-Z**

### **Special Topics in Computer and Information Systems**

0.5 - 4 units; 0.5 hour Lecture or 1.5 hours Laboratory

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 4 times.

Investigates special selected areas of interest in Computer and Information Systems not covered by regular *Catalog* offerings. The special areas will be announced, described, and given their own titles and letter designations in the *Schedule of Classes*.

## **CIS 164**

### **Introduction to Managing and Securing a Web Server**

3 units; 3 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 90.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Teaches installation, how to configure, manage, and secure the most widely used web server in the world, Apache. Topics include: web-server basics, installation, configuration, server-side programming, log files, robots, network security, web-server security, CGI security, web-client security and secure online transactions.

## **CIS 165J**

### **Introduction to Programming Database-Driven Web Sites With Java**

4 units; 3 hours Lecture, 6 hours Laboratory

Prerequisite: CS 12J or the equivalent.

Recommended Preparation: DM 160 or experience in the use of basic HTML; Eligibility for ENGL 100 and READ 100.

Programming database-driven, web-based application (such as an eCommerce web site) that require online data storage and retrieval and a high degree of user/web site interaction. The web programming environment used is Java accessing a MySQL database.

## **CIS 165PH**

### **Introduction to Programming Database-Driven Websites With PHP**

4 units; 3 hours Lecture, 5 hours Laboratory

Hybrid Requisite: completion of or current enrollment in CS 11 or CS 12J or CIS 132.

Recommended Preparation: DM 60A; Eligibility for ENGL 100 and READ 100; Eligibility for MATH 154.

Repeatability: May be taken a total of 2 times.

Teaches programming of database-driven, web-based applications (such as an eCommerce website) that require online data storage and retrieval and a high degree of user/website interactivity. The web programming environment used is PHP accessing a MySQL database. May be offered in a Distance-Learning Format.

## **CIS 170**

### **Introduction to Computer Hardware and Software**

4 units; 4 hours Lecture, 2 hours Laboratory

Prerequisite: CS 1 or equivalent.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Covers installing, maintaining, and upgrading PC-type (Intel and Intel compatible) microcomputer systems. Presents the underlying technology and methodology for performing these operations. Introduces networking, PC hardware and software installation, maintenance, safety, troubleshooting, and provides an in-depth exposure to personal computer hardware and desktop operating systems. Helps prepare students to pass the CompTIA A+ industry certification. May be offered in a Distance-Learning Format.

## **CIS 172**

### **Introduction to Operating Systems**

4 units; 4 hours Lecture, 2 hours Laboratory

Recommended Preparation: CS 1 and CS 1L or equivalent; Eligibility for ENGL 100 and READ 100.

Provides an overview of computer operating systems such as Unix/Linux, Microsoft Windows Operating Systems, and DOS. Topics include operating system theory, system requirements, file system management, network system integration, security, regular maintenance procedures, and an introduction to emergent technologies, their language and features, through lecture and hands-on lab. May be offered in a Distance-Learning Format.

## **CIS 175**

### **Fundamentals of Computer Security**

3 units; 3 hours Lecture, 2 hours Laboratory

Recommended Preparation: CIS 172 or equivalent knowledge; Eligibility for ENGL 100 and READ 100.

Introduces the threats and vulnerabilities of computer systems, and helps prepare for security-related industry certifications such as CompTIA Security+. Topics will include intrusion detection, intrusion prevention, encryption, VPNs, authentication, and implementing security procedures. Treats security not simply as a product to be installed, but as a way of thinking about all aspects of an organization's security needs.

## **CIS 185**

### **Advanced Routing (Cisco CCNP ROUTE)**

4 units; 4 hours Lecture, 4 hours Laboratory

Prerequisite: CIS 82 or equivalent knowledge.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 4 times.

Teaches implementing, monitoring, and maintaining routing services in an enterprise network. Covers planning, configuring, and verifying the implementation of complex enterprise LAN and WAN routing solutions, using a range of routing protocols in IPv4 and IPv6 environments. Also covers secure routing solutions for supporting branch offices and mobile workers. One of three Cisco CCNP (Cisco Certified Networking Professional) courses. Prepares students for the CCNP ROUTE exam. May be offered in a Distance-Learning Format.

**CIS 187****Implementing IP Switching (Cisco CCNP SWITCH)**

4 units; 4 hours Lecture, 4 hours Laboratory

Prerequisite: CIS 83 or passing the CCNA exam or equivalent experience.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 4 times.

Teaches students implementation, monitoring, and maintaining switching in converged enterprise campus networks. Covers planning, configuring, and verifying the implementation of complex enterprise switching solutions. Also covers the secure integration of VLANs, WLANs, voice, and video into campus networks. May be offered in a Distance-Learning Format.

**CIS 188****Maintaining and Troubleshooting IP Networks**

4 units; 4 hours Lecture, 4 hours Laboratory

Prerequisite: CIS 185 and CIS 187.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 4 times.

Teaches monitoring and maintaining complex, enterprise routed and switched IP networks. Covers planning and execution of regular network maintenance, as well as support and troubleshooting using technology-based processes and best practices, based on systematic and industry recognized approaches. One of three Cisco CCNP (Cisco Certified Networking Professional) courses. Prepares students for the Troubleshooting and Maintaining Cisco IP Networks (TSHOOT) exam. May be offered in a Distance-Learning Format.

**CIS 191A****UNIX/Linux Installation and Configuration**

2 units; 2 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 90 or equivalent.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Teaches the installation and configuration of the Linux operating system on a personal computer for use as a workstation or server. Topics include the structure of the UNIX operating system, disk and file system organization, system startup and shutdown, the X Window system, software installation, and troubleshooting issues. To demonstrate these skills, students will build their own custom Linux distribution. This is the first of two courses that prepares the student for industry certification as a UNIX/Linux System Administrator. May be offered in a Distance-Learning Format.

**CIS 191AB****UNIX/Linux Installation, Configuration and Administration**

4 units; 4 hours Lecture, 4 hours Laboratory

Prerequisite: CIS 90 or equivalent.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Introduces skills required to administer UNIX/Linux systems. Skills include installing and configuring a popular distribution, such as RedHat Linux, maintaining file and file system structures, distributing and monitoring processes, starting and stopping the system for routine maintenance and troubleshooting, rebuilding and upgrading the kernel, configuring peripheral devices such as printers and modems, backing up and restoring files, and disaster recovery. Develops skills through using both graphical and command line user interfaces, and will be demonstrated by building a custom version of Linux. Prepares students for several industry standard Linux certifications. May be offered in a Distance-Learning Format.

**CIS 191B****UNIX/Linux System Administration**

2 units; 2 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 90 or equivalent.

Recommended Preparation: CIS 191A; Eligibility for ENGL 100 and READ 100.

Teaches the administration, monitoring, and troubleshooting of a running Linux system in a small-to-medium sized business environment. Topics include user and group management, configuring peripheral devices, file system maintenance, kernel resources, system monitoring and logging, system backup and emergency recovery procedures. This is the second of two courses that prepares the student for industry certification as a UNIX/Linux System Administrator. May be offered in a Distance-Learning Format.

**CIS 192A****UNIX/Linux TCP/IP Administration**

2 units; 2 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 81 and CIS 90.

Recommended Preparation: CIS 191A; Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Teaches building, monitoring and troubleshooting of a UNIX/Linux network infrastructure. Configure arp caches, subnets, routing tables, IP addresses, and firewalls to establish a variety of network topologies. Use network monitors and sniffers to analyze protocols and packet headers at the various network layers. Use such protocols as ARP, ICMP, IP, TCP, UDP, FTP, and SSH along with network utilities to troubleshoot and secure networks. This course focuses on version four (ipv4) of the Internet protocol, and prepares the student for courses in network security. May be offered in a Distance-Learning Format.

## **CIS 192AB**

### **UNIX/Linux Network Administration**

4 units; 4 hours Lecture, 4 hours Laboratory

Prerequisite: CIS 81 and CIS 90 or equivalent.

Recommended Preparation: CIS 191AB; Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Build and monitor network infrastructures, and install, configure, and protect services on Linux TCP/IP networks. Configure arp caches, subnets, ip addresses, subnets to establish a variety of network topologies. Use various protocols and network utilities for troubleshooting and securing networks. Topics include the TCP/IP model, DHCP, DNS, NFS, SAMBA, FTP, HTTP, firewalls and various WAN technologies such as PPP and Virtual Private Networks. Readies students for Linux network administration through preparation for industry certification. May be offered in a Distance-Learning Format.

## **CIS 192B**

### **UNIX/Linux Network Services**

2 units; 2 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 192A.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Install, configure, and manage services on UNIX/Linux TCP/IP networks. Install client-server network applications on multi-segmented, routable networks. Configure and manage these services by editing text files from the command line as well as using graphical configuration tools. Services may include DHCP, DNS, NIS, NFS, SAMBA, FTP, HTTP, and various WAN technologies such as PPP and Virtual Private Networks. May be offered in a Distance-Learning Format.

## **CIS 193A**

### **UNIX/Linux Host Security Basics**

2 units; 2 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 191AB or CIS 191B.

Recommended Preparation: CIS 175; Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Teaches how to defend a UNIX/Linux network environment using network sniffers, intrusion detection and firewall technologies. Covers basic network traffic filtering and analysis, denial of service attacks, honeypots, authentication, encryption, VPNs and the securing of network services. May be offered in a Distance-Learning Format.

## **CIS 193AB**

### **UNIX/Linux Security Administration**

4 units; 4 hours Lecture, 4 hours Laboratory

Prerequisite: CIS 192AB.

Recommended Preparation: CIS 175; Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Teaches how to perform the tasks and examine the strategies of UNIX/Linux host, files, and network security management. Helps develop skills in managing firewalls, performing security audits, and detecting intrusions. Covers host-based intrusion detection, password cracking, auditing, access control, file encryption, VPNs and securing network services. Prepares for industry level certification in the area of Linux system security. May be offered in a Distance-Learning Format.

## **CIS 193B**

### **UNIX/Linux Network Security Basics**

2 units; 2 hours Lecture, 2 hours Laboratory

Prerequisite: CIS 192A.

Recommended Preparation: CIS 175; Eligibility for ENGL 100 and READ 100.

Repeatability: May be taken a total of 2 times.

Teaches how to secure a UNIX/Linux computer network using operating system security mechanisms as well as a variety of auditing, attack, and defense tools. Covers network intrusion detection, network traffic monitoring and analysis, denial of service attacks, and securing network services. May be offered in a Distance-Learning Format.

## **CIS 194**

### **Microsoft Windows Client Administration**

3 units; 3 hours Lecture, 3 hours Laboratory

Recommended Preparation: CIS 172 or equivalent knowledge; Eligibility for ENGL 100 and READ 100.

Configure and administer the Microsoft Windows client operating system. Includes using administrative tools to create user and group accounts, configure local policy, access shared resources on a network as well as how to manage disk space, user profiles, printers and hardware devices. This is the entry level course for students wishing to obtain a Cabrillo Skill Certificate or to pass one of the exams required for both MCSA and MCSE certifications. Please see Cabrillo website for more information. May be offered in a Distance-Learning Format.

## **CIS 195**

### **Microsoft Windows Server Administration (Semester 1)**

4 units; 4 hours Lecture, 3 hours Laboratory

Recommended Preparation: CIS 172 (may be taken concurrently); or equivalent knowledge and CIS 194 (may be taken concurrently); or equivalent knowledge; Eligibility for ENGL 100 and READ 100.

Configure and administer the Microsoft Windows Server operating system. Building on the features of the client operating system, this course adds the configuration and administration of the following services: Standalone file sharing, distributed file system, Active Directory and Group Policy. Learn how to join a standalone server to a domain and how to promote a member server to a domain controller. Work in both peer-to-peer and domain networked environments. Develop troubleshooting and problem solving skills required of system administrators. Prepares the student for exams in the MCSA and MCSE certification tracks. May be offered in a Distance-Learning Format.

## **CIS 196**

### **Microsoft Windows Network Administration (Semester 2)**

4 units; 4 hours Lecture, 3 hours Laboratory

Prerequisite: CIS 195 or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 and READ 100.

Implement and manage Microsoft network environments. Covers network issues in a peer-to-peer environment as well as a domain environment with Active Directory. Configure TCP/IP protocols, DHCP, DNS, and Routing and Remote Access Services; manage, secure, and troubleshoot Web, FTP, Certificate, and Terminal services and clients. Build upon the operating system features learned in CIS 194 and CIS 195. Prepares for one of the exams required for MCSA certification. May be offered in a Distance-Learning Format.