

## COMPUTER AND INFORMATION SYSTEMS

### Natural and Applied Sciences Division

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

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, Certificate of Achievements 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 A.S. Degree

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.

#### Learning Outcome:

1. Develop network documentation that demonstrates knowledge and skills acquired within a particular technology.  
 (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)

**A.S. General Education** **21 Units**  
**Core Courses (28 Units)** **Units**

CIS 72	Introduction to Operating Systems.....	4
CIS 75	Fundamentals of Computer Security .....	3
CIS 81	Computer Network Fundamentals.....	4
CIS 82	Routing and Switching Essentials.....	4
CIS 90	Introduction to UNIX/Linux.....	3

CIS 174	Virtualization Infrastructure (VMware ICM) .....	3
CIS 194	Microsoft Windows Client Administration .....	3

#### And one of the following courses:

CIS 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 31	Perl Programming in a UNIX Environment.....	4
CIS 32	Introduction to Internet Programming .....	4
CIS 33	Introduction to Programming Database-Driven Websites With PHP .....	4
CIS 98	UNIX/Linux Shell Programming.....	4

#### Completion of one or more of the Skills Certificates

#### and Approved Electives (11 Units)

	<b>Units</b>	
CIS 46	CCNA Security .....	4
CIS 54	Intro. to Database Management Systems .....	4
CIS 60A-ZZ	Special Topics in Computer and Information Systems .....	0.5 - 4
CIS 70	Introduction to Computer Hardware and Software .....	4
CIS 76	Introduction to Cybersecurity: Ethical Hacking. .	3
CIS 77	Computer Forensics Fundamentals .....	3
CIS 83	Switched Networks & Connecting Networks.....	4
CIS 99C	Career Work Experience Education .....	1 - 4
CIS 116	IPv6 Fundamentals.....	3
CIS 140NA	Network Analysis using Wireshark.....	3
CIS 140SM	Information Storage Management. ....	3
CIS 144	Introduction to Managing and Securing a Web Server .....	3
CIS 185	Advanced Routing-Cisco CCNP ROUTE .....	3
CIS 187	Implementing IP Switching-Cisco CCNP SWITCH.....	3
CIS 188	Maintaining and Troubleshooting IP Networks-CCNP TSHOOT.....	3
CIS 191AB	UNIX/Linux Installation, Configuration and Administration .....	4
CIS 192AB	UNIX/Linux Network Administration.....	4
CIS 195	Microsoft Windows Server Administration .....	4
CIS 196	Microsoft Windows Server Advanced Configuration .....	4
CABT 156	Writing for the Workplace .....	3
CABT 157	Business and Technical Writing.....	3

**Total Units** **60**

## Computer Networking and System Administration Certificate of Achievement

### Learning Outcome:

1. Demonstrate mastery of a computing knowledge base equivalent to passing an industry-level certification such as CompTIA, Cisco, Microsoft, Linux. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)

Core Courses (28 Units)		Units
CIS 72	Introduction to Operating Systems.....	4
CIS 75	Fundamentals of Computer Security .....	3
CIS 81	Computer Network Fundamentals.....	4
CIS 82	Routing and Switching Essentials.....	4
CIS 90	Introduction to UNIX/Linux.....	3
CIS 174	Virtualization Infrastructure (VMware ICM) .....	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 31	Perl Programming in a UNIX Environment.....	4
CIS 32	Introduction to Internet Programming .....	4
CIS 33	Introduction to Programming Database-Driven Websites With PHP .....	4
CIS 98	UNIX/Linux Shell Programming.....	4

### Required Courses

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

**Total Units** **34**

## Cisco Certified Network Professional (CCNP) Security Certificate of Achievement

### Program Description:

Prepares the student to take the Cisco Certified Network Professional (CCNP) industry certification exam.

### Learning Outcomes:

1. Demonstrate mastery of a networking knowledge base equivalent to obtaining CCNP certifications from Cisco Systems. (Communications, Critical Thinking, Global Awareness)
2. Implement network security. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)

### CCNA Requirements (12 Units)

CIS 81	Computer Network Fundamentals.....	4
CIS 82	Routing and Switching Essentials.....	4
CIS 83	Switched Networks & Connecting Networks.....	4

### CCNP Requirements (13 Units)

CIS 46	CCNA Security .....	4
CIS 185	Advanced Routing-Cisco CCNP ROUTE.....	3
CIS 187	Implementing IP Switching-Cisco CCNP SWITCH .....	3
CIS 188	Maintaining and Troubleshooting IP Networks ..	3

**Required Courses (6 Units)**

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

## Cisco Certified Network Associate (CCNA) Skills Certificate

### Program Description:

Prepares the student to take the Cisco Certified Network Associate (CCNA) industry certification exam.

### Learning Outcomes:

1. Demonstrate mastery of a networking knowledge base equivalent to obtaining CCNA certification from Cisco Systems. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)
2. Design and implement a converged network. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)

### Required Courses

CIS 81	Computer Network Fundamentals.....	4
CIS 82	Routing and Switching Essentials.....	4
CIS 83	Switched Networks & Connecting Networks.....	4

**Total Units** **12**

## Cybersecurity Skills Certificate

### Program Description:

Helps prepare students for entry-level positions and industry certification exams such as CompTIA Security+ and the International Council of E-Commerce Consultants (EC-Council) Certified Ethical Hacker (CEH) and the Computer Hacking Forensics Investigator (CHFI) certifications.

### Learning Outcome:

1. Demonstrate mastery of security knowledge and skills equivalent to obtaining CompTIA Security+.

### Required Courses

CIS 75	Fundamentals of Computer Security .....	3
CIS 76	Introduction to Cybersecurity: Ethical Hacking. .	3
CIS 77	Computer Forensics Fundamentals .....	3
CIS 81	Computer Network Fundamentals.....	4

**Total Units** **13**

## Microsoft System Administration Skills Certificate

### Program Description:

Prepares the student to take the Microsoft Certified Professional industry certification exams.

### Learning Outcome:

1. Demonstrate mastery of a computing knowledge base equivalent to obtaining Microsoft certifications from Microsoft. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional development)

### Required Courses

CIS 81	Computer Network Fundamentals.....	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**

## UNIX/Linux System Administration Skills Certificate

### Program Description:

Helps prepare students to work with the UNIX/Linux operating system at the client and server levels.

### Learning Outcome:

1. Demonstrate mastery of a computing knowledge base equivalent to passing an industry-level certification such as CompTIA and Linux Professional Institute. (Communications, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)

### Required Courses

CIS 90	Introduction to UNIX/Linux.....	3
CIS 98	UNIX/Linux Shell Programming.....	4
CIS 191AB	UNIX/Linux Installation, Configuration and Administration .....	4
CIS 192AB	UNIX/Linux Network Administration.....	4

**Total Units** **15**

## COMPUTER SUPPORT

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### Computer Support A.S. Degree

The Computer Support 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 CompTIA, A+ Preparation, and Computer Support Technician 1.

The following courses are recommended for potential Computer Support majors early in their academic career to help determine their interest in pursuing the major: CS 1 and CS 1L.

### Learning Outcomes:

1. Explain Information Technology (IT) concepts as they relate to the preparation and presentation of technical information. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)
2. Document and communicate problem, analysis and resolution process. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)
3. Implement solutions to customer problems that minimize risk and disruption to productivity. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)

### A.S. General Education

**21 Units**

#### Core Courses (25 Units)

**Units**

CIS 70	Introduction to Computer Hardware and Software .....	4
CIS 72	Introduction to Operating Systems.....	4
CIS 81	Computer Network Fundamentals.....	4
CIS 90	Introduction to UNIX/Linux .....	3
CIS 103	Technical Support as a Profession.....	4
CIS 174	Virtualization Infrastructure (VMware ICM) .....	3
CIS 194	Microsoft Windows Client Administration .....	3

Either COMM 1/1H or COMM 2 or COMM 10 is required and may be used to meet the A2: Critical Thinking requirement for General Education.

#### Completion of one or more of the Skills Certificates and Approved Electives (6 Units)

**Units**

CIS 31	Perl Programming in a UNIX Environment.....	4
CIS 32	Introduction to Internet Programming .....	4
CIS 33	Intro to Programming Database-Driven Websites with PHP .....	4
CIS 46	CCNA Security .....	4
CIS 54	Intro. to Database Management. ....	4
CIS 60A-ZZ	Special Topics in Computer and Information	

	Systems.....	0.5 - 4
CIS 75	Fundamentals of Computer Security .....	3
CIS 82	Routing and Switching Essentials.....	4
CIS 98	UNIX/Linux Shell Programming.....	4
CIS 99C	Career Work Experience Education .....	1 - 4
CIS 116	IPv6 Fundamentals.....	3
CIS 140NA	Network Analysis using Wireshark.....	3
CIS 144	Introduction to Managing and Securing a Web Server .....	3
CIS 191AB	UNIX/Linux Installation, Configuration and Administration .....	4
CIS 192AB	UNIX/Linux Network Administration.....	4
CIS 195	Microsoft Windows Server Administration .....	4
CIS 196	Microsoft Windows Server Advanced Configuration .....	4
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
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 60	Web Publishing I: HTML and CSS.....	4
DM 61	Responsive Web Design.....	4
DM 70	Web Design using Dreamweaver.....	4

**Total Units****60**

\*spring only; \*\*fall only

**Computer Support Certificate of Achievement****Learning Outcome:**

1. Explain Information Technology (IT) concepts as they relate to the preparation and presentation of technical information. (Communication, Critical Thinking, Global Awareness, Personal Responsibility and Professional Development)

**Core Courses (25 Units)**

CIS 70	Introduction to Computer Hardware and Software .....	4
CIS 72	Introduction to Operating Systems.....	4
CIS 81	Computer Network Fundamentals.....	4
CIS 90	Introduction to UNIX/Linux .....	3
CIS 103	Technical Support as a Profession.....	4
CIS 174	Virtualization Infrastructure (VMware ICM). .....	3
CIS 194	Microsoft Windows Client Administration .....	3

**Required Courses (6 Units)**

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

**Total Units****31****A+ Preparation Skills Certificate**

Prepares the student to work with computer hardware and software, and take the CompTIA A+ industry certification exam.

**Learning Outcomes**

1. Analyze symptoms of host software, hardware, or networking configuration errors. (Critical Thinking)

**All skills certificates assume the successful completion of CS1 and CS 1L or equivalent skills.**

**Required Courses**

CIS 70	Intro to Computer Hardware & Software.....	4
CIS 72	Introduction to Operating Systems.....	4
CIS 194	Microsoft Windows Client Administration .....	3
CIS 195	Microsoft Windows Server Administration .....	4

**Total Units****15****Computer Support Technician 1 Skills Certificate**

Prepares the student to provide support to users in the information processing department of a company by using specialized computer knowledge and skills. Specifically, support technicians communicate effectively with users and ensure computer hardware and software operate properly.

**Learning Outcomes**

1. Develop technical documentation for computer user training. (Critical Thinking, Professional Development, Communication)

**Required Courses**

CIS 70	Intro to Computer Hardware and Software.....	4
CIS 72	Introduction to Operating Systems.....	4
CIS 90	Introduction to UNIX/Linux .....	3
or		
CIS 103	Technical Support as a Profession.....	4
CIS 194	Microsoft Windows Client Administration .....	3
COMM 6	Listening.....	1

**Total Units****15 - 16**

## Computer & Information Systems Courses

### CIS 15 Cloud Programming with Python

4 units; 4 hours Lecture, 1 hour Laboratory

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

Repeatability: May be taken a total of 1 time.

Teaches the fundamental concepts and models of application development including the basic concepts of program design, data structures, programming, problem solving, programming logic, and fundamental design techniques for event-driven programs. Provides hands-on experience with a modern application programming language and development platform. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU; UC.

### CIS 31 Perl Programming in a UNIX Environment

4 units; 3 hours Lecture, 4 hours Laboratory

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

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

Repeatability: May be taken a total of 1 time.

Introduces Perl programming in a Unix environment including the Emacs text editor, variables, arrays, lists, functions, and regular expressions. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU; UC.

### CIS 32 Introduction to Internet Programming

4 units; 3 hours Lecture, 4 hours Laboratory

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

Repeatability: May be taken a total of 1 time.

Presents an introduction to Internet-related programming using primarily client-side scripting languages like JavaScript. 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.

*Transfer Credit:* Transfers to CSU; UC.

### CIS 33 Introduction to Programming Database-Driven Websites With PHP

4 units; 3 hours Lecture, 4 hours Laboratory

Hybrid Requisite: Completion of or concurrent enrollment in CS 11 or CS 12J or CS 12GP or CIS 32.

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

Repeatability: May be taken a total of 1 time.

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.

*Transfer Credit:* Transfers to CSU.

### CIS 34 Mobile Applications - iOS and Android

4 units; 3 hours Lecture, 4 hours Laboratory

Prerequisite: CS 11 or CS 12J or CS 12GP and MATH 152 or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Presents an overview of mobile devices and instruction for building mobile applications, including Swift for iOS and Java for Android. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU; UC.

### CIS 35 Mobile Game Development

4 units; 3 hours Lecture, and 4 hours Laboratory

Prerequisite: CS 11 or CS 12J or CS 12GP and MATH 152 or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Presents an overview of mobile devices and instruction for building mobile games. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU; UC.

### CIS 46 CCNA Security

4 units; 4 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 82 and CIS 83 or equivalent skills.

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

Repeatability: May be taken a total of 1 time.

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.

*Transfer Credit:* Transfers to CSU.

### CIS 54 Introduction to Database Management Systems

4 units; 4 hours Lecture, 1 hour Laboratory

Recommended Preparation: CIS 90; Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Teaches the core concepts in data management centered on modeling organizational information requirements, normalization techniques, and implementation using Structured Query Language (SQL) with an industry recognized relational database management system. Includes database administration, data quality, security, programming language interfaces, and the role of data in business. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

### **CIS 70 Introduction to Computer Hardware and Software**

4 units; 4 hours Lecture, 1 hour Laboratory

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

Repeatability: May be taken a total of 1 time.

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.

*Transfer Credit:* Transfers to CSU.

### **CIS 72 Introduction to Operating Systems**

4 units; 4 hours Lecture, 1 hour Laboratory

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

Repeatability: May be taken a total of 1 time.

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

*Transfer Credit:* Transfers to CSU.

### **CIS 75 Fundamentals of Computer Security**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 81 or equivalent skills.

Recommended Preparation: CIS 72 or equivalent skills; Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Introduces fundamental principles and topics of Information Technology Security and Risk Management at the organizational level. Addresses hardware, software, processes, communications, applications, and policies and procedures with respect to organizational Cybersecurity and Risk Management. Helps prepare for the CompTIA Security+ certification exams. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU. C-ID: ITIS 160

### **CIS 76 Introduction to Cybersecurity: Ethical Hacking**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 75.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Introduces the various methodologies for attacking a network. Covers network attack methodologies with the emphasis on student use of network attack techniques and tools, and appropriate defenses and countermeasures. Provides a hands-on practical approach to penetration testing measures and ethical hacking. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

### **CIS 77 Computer Forensics Fundamentals**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 75.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Introduces the methods used to properly conduct a computer forensics investigation beginning with a discussion of ethics, while mapping to the objectives of the International Association of Computer Investigative Specialists (IACIS) certification. Introduces computer forensics as a profession; the computer investigation process; understanding operating systems, boot processes and disk structures; data acquisition and analysis; technical writing; and familiar computer forensics tools. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

### **CIS 81 Computer Network Fundamentals**

4 units; 4 hours Lecture, 1 hour Laboratory

Hybrid Requisite: Completion of or concurrent enrollment in CIS 72 or equivalent skills.

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

Repeatability: May be taken a total of 1 time.

Covers the architecture, structure, functions, components, and models of the Internet and other computer networks. Introduces the principles and structure of IP (Internet Protocol) addressing and the fundamentals of Ethernet concepts, media, and operations to provide a foundation for further study of computer networks. Uses the OSI (Open Systems Interconnection), and TCP (Transmission Control Protocol) layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. Preparation for the CompTIA Network+ certification exam. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

**CIS 82 Routing and Switching Essentials**

4 units; 4 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 81.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Describes the architecture, components, and operations of routers and switches for small networks. Teaches configuration of a router and a switch for basic functionality. Includes configuration and troubleshooting of routers and switches and resolving common issues with single-area and multi-area OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

**CIS 83 Switched Networks and Connecting Networks**

4 units; 4 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 81.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Covers intermediate features of networks including switching and routing technologies, VLANs, VTP, STP, EtherChannel, network device security, troubleshooting, and WAN technologies. Provides hands-on experience using Cisco routers and switches. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU.

**CIS 90 Introduction to UNIX/Linux**

3 units; 3 hours Lecture, 1 hour Laboratory

Recommended Preparation: CS 1L or CIS 72; Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

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 preparing for industry certification. May be offered in a Distance-Learning Format.

*Transfer Credit:* Transfers to CSU; UC.

**CIS 98 UNIX/Linux Shell Programming**

4 units; 4 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 90.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

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.

*Transfer Credit:* Transfers to CSU; UC.

**CIS 103 Technical Support as a Profession**

4 units; 4 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 70 and CIS 72 or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Teaches technical support skills for those seeking employment in the computer and information systems field. Includes 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.

*Transfer Credit:* Non-transferable.

**CIS 116 IPv6 Fundamentals**

3 units; 2 hours Lecture, 3 hours Laboratory

Prerequisite: CIS 81.

Recommended Preparation: CIS 82; Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Introduces IPv6 addressing and address types, dynamic IPv6 address assignment using SLAAC and DHCPv6, ICMPv6 Neighbor Discovery, routing IPv6, and securing an IPv6 network. Covers network integration of IPv6 with IPv4 to transition to IPv6. May be offered in a Distance-Learning Format.

*Transfer Credit:* Non-transferable.

**CIS 140NA Network Analysis using Wireshark**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 82 or CIS 83.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Teaches practical network management skills using the Wireshark network analyzer. Provides a logical troubleshooting approach to capturing and analyzing data frames. Teaches to effectively troubleshoot, maintain, optimize, and monitor network traffic. May be offered in a Distance-Learning Format.

*Transfer Credit:* Non-transferable.

**CIS 140SM Information Storage Management**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 72 or CIS 81.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Covers basic principles of information storage and management. Includes important segments of information storage technology such as storing, managing, networking, accessing, protecting, securing, sharing, and optimizing information. May be offered in a Distance-Learning Format.

*Transfer Credit:* Non-transferable.

### **CIS 160A-Z Special Topics in Computer and Information Systems**

0.5 – 4 units; 0.5 – 4 hours Lecture or 1.5 – 12 hours Laboratory  
Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

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*.

*Transfer Credit:* Non-transferable.

### **CIS 174 Virtualization Infrastructure (VMware ICM)**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 72 and CIS 81.

Recommended Preparation: CIS 70; Eligibility for ENGL 100 or ESL 100 and READ 100; Eligibility for MATH 154.

Repeatability: May be taken a total of 1 time.

Teaches installation, configuration, and management of virtual infrastructure. Covers virtualization of hardware, computing systems, and applications. Uses VMware Install, Configure, Manage curriculum. May be offered in a Distance-Learning Format.

*Transfer Credit:* Non-transferable.

### **CIS 185 Advanced Routing--Cisco CCNP ROUTE**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 82 or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

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.

*Transfer Credit:* Non-transferable.

### **CIS 187 Implementing IP Switching--Cisco CCNP SWITCH**

3 units; 3 hours Lecture, 1 hour Laboratory

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

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Teaches 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.

*Transfer Credit:* Non-transferable.

### **CIS 188 Maintaining and Troubleshooting IP Networks--CCNP TSHOOT**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 185 and CIS 187.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

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.

*Transfer Credit:* Non-transferable.

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

4 units; 4 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 90 or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Introduces skills required to administer UNIX/Linux systems. Skills include installing and configuring a popular distribution, such as Red-Hat 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. Skills 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.

*Transfer Credit:* Non-transferable.

### **CIS 192AB UNIX/Linux Network Administration**

4 units; 4 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 81 and CIS 90 or equivalent skills.

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

Repeatability: May be taken a total of 1 time.

Teaches building and monitoring of network infrastructures, and the installation, configuration, and protection services on Linux TCP/IP networks. Configure ARP caches, subnets, IP addresses, subnets to establish a variety of network topologies. Teaches 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. Prepares students for Linux network administration through preparation for industry certification. May be offered in a Distance-Learning Format.

*Transfer Credit:* Non-transferable.



## **CIS 194      Microsoft Windows Client Administration**

3 units; 3 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 72.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

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.

*Transfer Credit:* Non-transferable.

## **CIS 195      Microsoft Windows Server Administration**

4 units; 4 hours Lecture, 1 hour Laboratory

Recommended Preparation: CIS 72 or CIS 194 (may be taken concurrently) or equivalent skills; Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Teaches configuration and administration of the Microsoft Windows server operating system. Builds on the features of the client operating system by adding the configuration and administration of the following services: standalone file sharing, distributed file system, Active Directory and Group Policy. Includes joining a standalone server to a domain and promoting a member server to a domain controller. Develops troubleshooting and problem solving skills required of system administrators. Helps prepare students for exams in the Microsoft certification tracks. May be offered in a Distance-Learning Format.

*Transfer Credit:* Non-transferable.

## **CIS 196      Microsoft Windows Server Advanced Configuration**

4 units; 4 hours Lecture, 1 hour Laboratory

Prerequisite: CIS 195 or equivalent skills.

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and READ 100.

Repeatability: May be taken a total of 1 time.

Teaches implementation and management of 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.

*Transfer Credit:* Non-transferable.