

El Camino College COURSE OUTLINE OF RECORD – Approved

Ι.	GENERAL COURSE INFORMATION		
	Subject and Number:	Electronics and Computer Hardware Technology 146	
	Descriptive Title:	CompTIA Network+ Certification Preparation for Computer Hardware Systems	
	Course Disciplines:	Electronics AND Electronic Technology	
	Division:	Industry and Technology	

### **Catalog Description:**

This course is designed for the student pursuing a career as a computer service technician. Students will develop the skills and knowledge required for passing the CompTIA Network+ Certification exam. Topics include set up configuration and troubleshooting of networking hardware devices. Other areas explored include networking topology, cabling, wireless devices, network standards, protocols and security.

Note: Letter grade or pass/no pass option.

### Conditions of Enrollment:

Recommended Preparation: Electronics and Computer Hardware Technology 140

Course Length:	X Full Term	Other (Specify number of weeks):
Hours Lecture:	2.00 hours per	week TBA
Hours Laboratory:	4.00 hours per	week TBA
Course Units:	3.00	
Grading Method:	Both	
Credit Status	Associate Degr	ree Credit
Transfer CSU:	X Effective Da	te: 2/16/2010
Transfer UC:	Νο	
General Education:		
El Camino College:		
CSU GE:		

IGETC:

### **II. OUTCOMES AND OBJECTIVES**

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

### SLO #1 Course Notebook

The students will assemble and maintain a five-section course notebook.

### SLO #2 CompTIA Network+ Certification Exam

Students will develop the skills and knowledge required for passing the CompTIA Network+ Certification exam. Topics include set up configuration and troubleshooting of networking hardware devices. Other areas explored include networking topology, cabling, wireless devices, network standards, protocols and security.

### SLO #3 Open Systems Interconnection

Students will demonstrate their knowledge of Open Systems Interconnection (OSI), the seven layers of the OSI model, protocol and data packets, and the standard network model.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at <a href="http://www.elcamino.edu/academics/slo/">http://www.elcamino.edu/academics/slo/</a>.

- B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)
  - 1. Analyze proper procedures for installing and configuring network components and devices.
    - Laboratory reports
  - 2. Diagnose and troubleshoot network problems and determine whether they are hardware or software related.
    - Laboratory reports
  - 3. Identify troubleshooting procedures in a networking environment and preventative maintenance techniques to maintain a network system.
    - Objective Exams
  - 4. Compare and contrast network standards, types of networks, topologies and hardware devices.
    - Objective Exams
  - 5. Explain the sharing of a printer on a network and identify the procedures for servicing network printers.
    - Objective Exams
  - 6. Identify the unique components of wireless network systems.
    - Written homework
  - 7. Select and define the types of networking media and hardware components.
    - Term or other papers
  - 8. Set up a new computer system to function on a secure network. Laboratory reports

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	1	I	OVERVIEW OF THE COMPTIA NETWORK+ EXAM A. The CompTIA Network+ exam B. History of computers and networking systems
Lab	2	11	THE COMPTIA NETWORK+ EXAM A. The CompTIA Network+ exam B. History of computers and networking systems
Lecture	2	111	INTRODUCTION TO NETWORKING A. Types of networks B. How networks are used
Lab	2	IV	INTRODUCTION TO NETWORKING A. Types of networks B. How networks are used
Lecture	2	v	NETWORKING STANDARDS AND THE OPEN SYSTEMS INTERCONNECTION (OSI) MODEL A. Networking standards organizations B. The OSI model
Lab	4	VI	NETWORKING STANDARDS AND OSI MODEL A. Networking standards organizations B. The OSI model
Lecture	4	VII	TRANSMISSION BASICS AND NETWORKING MEDIA A. Transmission basics B. Networking media 1. Coaxial cable 2. Twisted pair cable 3. Fiber-optic cable 4. Structured cabling
Lab	8	VIII	TRANSMISSION BASICS AND NETWORKING MEDIA A. Transmission basics B. Networking media 1. Coaxial cable 2. Twisted pair cable 3. Fiber-optic cable 4. Structured cabling
Lecture	2	іх	INTRODUCTION TO TRANSMISSION CONTROL PROTOCOL/INTERNET (TCP/IP) PROTOCOL A. The TCP/IP core protocols B. IP Version 4 and IP Version 6 addressing C. Assigning IP addresses
Lab	4	x	INTRODUCTION TO TCP/IP PROTOCOL A. The TCP/IP core protocols B. IP Version 4 and IP Version 6 addressing C. Assigning IP addresses

Lecture	2	хі	TOPOLOGIES AND ETHERNET STANDARDS A. Physical topologies
Lecture	Z		B. Logical topologies
			C. Ethernet standards
			TOPOLOGIES AND ETHERNET STANDARDS
Lah	Λ	VII	A. Physical topologies
Lab	4	XII	B. Logical topologies
			C. Ethernet standards
			NETWORK HARDWARE
			A. Network Interface Cards (NICS)
Lecture	4	XIII	B. Hubs and repeaters
			C. Bridges and switches
			D. Gateways and routers
			NETWORK HARDWARE
			A. NICS
Lab	8	XIV	B. Hubs and repeaters
			C. Bridges and switches
			D. Gateways and routers
			WIDE AREA NETWORKS (WANS) AND REMOTE CONNECTIVITY
Lecture	2	XV	A. WANS topologies
			B. Remote connectivity
			WANS AND REMOTE CONNECTIVITY
Lab	2	XVI	A. WANS topologies
			B. Remote connectivity
			WIRELESS NETWORKS
Locturo	2	VV/II	A. Wireless transmission
Lecture	Z	XVII	B. Wireless networks
			C. Bluetooth networks
			WIRELESS NETWORKS
lah	Л	XVIII	A. Wireless transmission
Lau	4		B. Wireless networks
			C. Bluetooth networks
		ХІХ	NETWORK OPERATING SYSTEMS (OS)
			A. Features of network OS
Lecture	2		B. Network OS and servers
			C. Linux, Mac, Novell, Unix and
			Windows Network OS
		4 XX	NETWORK OS
			A. Features of network OS
Lab	4		B. Network OS and servers
			C. Linux, Mac, Novell, Unix and
			Windows Network OS
		2 XXI	ADVANCED TCP/IP NETWORKING
Lecture	2		A. Designing TCP/IP networks
			B. TCP/IP utilities
		xxII	ADVANCED TCP/IP NETWORKING
			A. Designing TCP/IP networks
Lab	3		B. TCP/IP utilities

Lecture	2	ххш	VOICE AND VIDEO OVER IP A. VoIP (voice over IP) B. Video over IP
Lab	2	xxiv	VOICE AND VIDEO OVER IP A. VoIP B. Video over IP
Lecture	2	xxv	NETWORK SECURITY A. Security risks and threats B. Physical security C. Network OS security D. Wireless network security
Lab	4	XXVI	NETWORK SECURITY A. Security risks and threats B. Physical security C. Network OS security D. Wireless network security
Lecture	2	xxvii	TROUBLE-SHOOTING NETWORK PROBLEMS A. Network troubleshooting methods B. Network troubleshooting tools
Lab	4	xxviii	TROUBLE-SHOOTING NETWORK PROBLEMS A. Network troubleshooting methods B. Network troubleshooting tools
Lecture	2	ххіх	NETWORK INTEGRITY AND AVAILABILITY A. Malware B. Fault tolerance C. Data backups D. Disaster recovery
Lab	3	ххх	NETWORK INTEGRITY AND AVAILABILITY A. Malware B. Fault tolerance C. Data backups D. Disaster recovery
Lecture	2	хххі	NETWORK MANAGEMENT A. Fundamentals of network management B. Fault and performance management C. Asset and change management
Lab	4	хххи	NETWORK MANAGEMENT A. Fundamentals of network management B. Fault and performance management C. Asset and change management
Lecture	1	хххш	SEMESTER PROJECT DEVELOPMENT A. Critical analysis B. Individual and group discussion C. Outlining template for term project
Lab	10	XXXIV	SEMESTER PROJECT DEVELOPMENT A. Critical analysis B. Individual and group discussion C. Presentation of term project
Total Lecture Hours		ture Hours	36

Total Laboratory Hours	72
Total Hours	108

### IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

### A. PRIMARY METHOD OF EVALUATION:

Skills demonstrations

#### B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

After replacing a network interface card in a customer's computer, the computer does not access the network or Internet. On a one-page lab report, list three possible reasons why the computer system cannot access the network and Internet. Submit lab report to the instructor.

#### C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

Provided with a new computer system, configure the system to logon to a networked environment, enter the proper system settings and test the system for proper operation and connectivity. Consult the instructor for evaluation.

Troubleshoot a non-working wireless router. Diagnose and configure router for proper operation. Report findings on a one-page lab report and submit to the instructor.

#### D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Essay exams Performance exams Objective Exams Other exams Quizzes Written homework Laboratory reports Class Performance Homework Problems Term or other papers Multiple Choice Completion Matching Items True/False Other (specify): Network System Design Research Assignment

### V. INSTRUCTIONAL METHODS

Demonstration Discussion Group Activities Guest Speakers Laboratory Lecture Multimedia presentations Other (please specify) This is an in-class assignment. Computer Based Training (CD-ROM software for enhanced student training)

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

### VI. WORK OUTSIDE OF CLASS

Study Answer questions Skill practice Required reading Problem solving activities Written work

### Estimated Independent Study Hours per Week: 4

### VII. TEXTS AND MATERIALS

### A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Todd Lammle, CompTIA Network+ Study Guide, 4th edition, 2018

Jill West, Tamara Dean, Jean Andrews, <u>NETWORK+ GUIDE TO NETWORKS</u>, 8<sup>th</sup> edition, Cengage Learning, 2018

Todd Verge, <u>LAB MANUAL FOR NETWORK+ GUIDE TO NETWORKS</u>, 7th edition, Cengage Learning, 2015 INDUSTRY STANDARD

## **B. ALTERNATIVE TEXTBOOKS**

Emmett Dulaney, COMPTIA NETWORK+ N10-006, Exam Cram w/CD, 5th ed., Pearson Publishing, 2015 INDUSTRY STANDARD

#### C. REQUIRED SUPPLEMENTARY READINGS

### D. OTHER REQUIRED MATERIALS

2 Blank CD-RW disks 4 Blank DVD-RW disks 1 USB Flash Drive of at least 2GB of storage 1 - 3 Ring Binder - 1 1/2" hard cover

#### A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	<b>Category and Justification</b>
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### B. Requisite Skills

Requisite Skills	uisite Skills
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### C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
Course Recommended Preparation Electronics and Computer Hardware Technology 140 or equivalent	
Non-Course Recommended Preparation Equivalent	If students have not taken ECHT 140 but have taken a similar course at another college or have understanding of basic computer hardware technology, they will be prepared to enroll in this course. It is recommended that students have basic computer hardware knowledge or they may not succeed in this class.

#### D. Recommended Skills

**Recommended Skills** 

Understand computer system design and operational concepts. ECHT 140 -Understand the operating principals of computer system hardware.

Understand analog and digital concepts involving computer systems. ECHT 140 - Understand the operating principals of computer system hardware.

Assemble and disassemble personal computer systems, and install operating system software. ECHT 140 - Assemble and disassemble computer systems using industry standard techniques and safety procedures.

#### E. Enrollment Limitations

<b>Enrollment Limitations and Category</b>	<b>Enrollment Limitations Impact</b>

## Course created by Osanne Ugya on 09/01/1989

#### BOARD APPROVAL DATE: 03/12/1990

LAST BOARD APPROVAL DATE: 06/17/2019

# Last Reviewed by STEVE COCCA