CIT 1503 | Network+ Certification Preparation

Spring 2024 - 16 Weeks Syllabus

Instructor Information

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Instructor Welcome Video

Welcome to my class! I'm thrilled to have the opportunity to guide you through the exciting world of technology and cybersecurity. My name is Samantha Bell, and I am passionate about equipping you with the knowledge and skills you need to navigate the ever-evolving landscape of digital security.

My educational journey has been shaped by determination and a thirst for knowledge. As a single parent of four young children, I pursued a Masters in Internet Security from American InterContinental University. This endeavor was undertaken online, showcasing my commitment to both education and family. Prior to this, I earned a Bachelors in Information Systems & Operations Management from the University of Central Oklahoma and an Associates in Computer Science from Phillips County Community College in my hometown of Helena, Arkansas.

Technology has always fascinated me, and my curiosity was ignited when I first learned about the Stuxnet virus, the pioneer of digital weapons. Intrigued by the implications of this development, I dedicated myself to understanding its intricacies and undertook a deep dive into the field of cyber security. This pursuit culminated in my Masters thesis on Stuxnet, which remains a testament to my dedication to exploring the far-reaching implications of technological advancements.

My career has been marked by diverse experiences that have enriched my understanding of technology's multifaceted applications. From teaching Microsoft Office and Photoshop in public schools to project management roles at Cisco IP Phone systems, Dell computers' enterprise sales, and advanced technical

support at AT&T, I've amassed a wealth of practical knowledge. My eight-year tenure at Apple as a Senior Technical Manager honed my problem-solving skills and commitment to exceptional customer service.

My journey has led me to Rose State, where I'm thrilled to be part of your learning experience. I acknowledge that technology is a rapidly changing domain, and to stay current, I embarked on a journey to refresh my networking knowledge, culminating in a digital badge from Cisco Network Academy. I currently hold CompTIA Network+ and CompTIA Security+ certifications, and my goal is to help you achieve your certification milestones as well.

As we embark on this semester together, I encourage you to approach each lesson with enthusiasm and a hunger for knowledge. My door is always open for questions, discussions, and insights, and I'm eager to get to know each and every one of you. Remember, no matter your age, the pursuit of knowledge is a lifelong endeavor, and I'm excited to accompany you on this journey.

Looking forward to a fantastic semester ahead!

Warm regards,

Professor Samantha Bell

Quote:

"It's easier to exploit a human to get into a network than to exploit a network to get into a human."

Kevin Mitnick

Communication Preferences & Response Times

Please email me in of side Canvas. I will get your messages and respond back to you much quicker inside canvas then if you email me to my @rose.edu address. I check Canvas first and take canvas as a priority, and your email will less likely get lost. I will always reply back to you with in 24 hours if I do not reply back to you with in 24 hours please email me again. I prefer you to email me before you call because I will always reply back as fast as I can, regardless if I am able to help you right then or not. I will then flag it to be done as soon as possible, in canvas. **For emergencies here is my cell number 405.981.7976** I do not answer that phone from numbers not in my contacts list. I am not putting your names in my contact list. However, if your stressing and you can not get me to reply back please text me and tell me what class your in and what hour your class is because I have two of the 1503 classes.

Course Information

Course Title: Network+ Certification Preparation
Course Number: CIT 1503 2312
Day and Time: (Online)
Location: I have merged all the Networking + classes together, so you will see online for your course in Canvas. Regardless if your in the physical class or the online class you can do the course online, or in person. Currently I have an online class and a in person class FLEX, which means if any of you want to come to class or attend on Zoom on Tuesday - Thursdays 4:15-5:30pm you are welcome to do so, or you can watch the recorded videos. You are not required to come to class, however, you need to make sure that you are keeping up with your schedule of assignments you will get deductions for missing work and I will not go back and change the due dates. You turn it in and if it is not done when the due date is set you will get late penalty.

You can work ahead on your material, we will be using TestOut Course work, through CompTIA. We will do labs in the computer lab on second class day of each week at the class time. All labs will be recorded and done in class, you do not have to do them in class but it would be beneficial if you attend the labs as it is the hands on portion of the course. If you already have hands on and want to do the labs on your own you are welcome to do so.

Course Description & Prerequisites

It is advised that you have taken the A+ Certification prep course prior to this course, but is not required.

CIT 1503 Network+ Certification Preparation (3-0-3) This course is an introductory course which covers the fundamental hardware and software concepts involved in a basic network. The standard open systems interconnect model, popular LAN topologies and network administration will be discussed. Lab fee: $10. [Fa,Sp,Su]

Delivery Method and Course Structure

All your classroom sessions will be recorded and you may watch them at any time that you are able to do so. We will be doing labs on Thursdays. Tuesdays we will go over PowerPoints for each chapter.

TestOut has 13 chapter and we still go through a chapter a week. There is a lot of information in this course. Please make sure your reading your chapters before doing the work. You will also be taking quizzes through out this course. Mostly each week per chapter.

Textbook & Instructional Materials

TestOut
Author: TestOut
Publisher: MICE
Here is Mice information,

https://www.micek12.com/rose/

1) Select the product to add it to the cart and then complete the check-out process.

a. Payments require a credit card (or Paypal account) and there is a 4% convenience charge per transaction.

2) When each student pays for their account, I will send them the login information to access the courses.

Course access is the traditional secondary school year per our licensing agreement: August 2023 to June 30, 2024.

The license is for all courses for that time

Course Overview

Preface

Knowing how to install, configure, and troubleshoot a computer network is a highly marketable and exciting skill. This course first introduces the fundamental building blocks that form a modern network, such as hardware, topologies, and protocols, along with an introduction to the OSI model. It then provides in-depth coverage of the most important concepts in contemporary networking, including TCP/IP, Ethernet, wireless transmission, virtual networks, cloud computing, segmentation, security, performance optimization, and troubleshooting. After reading the modules and completing the exercises, you will be prepared to select the network design, hardware, and software that best fit your environment. You will also have the skills to build a network from scratch and maintain, upgrade, troubleshoot, and manage an existing network. Finally, you will be well-prepared to take CompTIA's Network+ N10-008 certification exam.

This course explains technical concepts logically and in a clear, approachable style. In addition, concepts are reinforced by real-world examples of networking issues from a professional's standpoint. Each module opens with an "On the Job" story from a network engineer, technician, or administrator. These insightful stories of actual events, along with Applying Concepts activities, Hands-On Projects, and Capstone Projects in each module, make this text a practical learning tool. The numerous tables and color illustrations, along with the glossary, appendices, and study questions, provide a valuable reference for any networking professional.

Intended Audience

This course is intended to serve the needs of students and professionals who are interested in mastering fundamental, vendor-neutral networking concepts. No previous networking experience is necessary to begin learning from this text, although knowledge of basic computer principles is helpful. Those seeking to pass CompTIA's Network+ certification exam will find the course's content, approach, and numerous study questions especially helpful. For more information on CompTIA® Network+ certification, visit CompTIA's website at comptia.org.

The course's pedagogical features are designed to provide a truly interactive learning experience, preparing you for the challenges of the highly dynamic networking industry. In addition to the information presented in the text, each module includes Applying Concepts activities and Hands-On Projects that guide you through software and hardware configuration in a step-by-step fashion. At the end of each module, you will also find progressive Capstone Projects that give you the opportunity to build on previous

modules' work and connect ideas from module to module using various virtualized, emulated, and cloud environments.

Module Descriptions

The following list summarizes the topics covered in each module of this course:

Module 1, "Introduction to Networking," begins by answering the question "What is a network?" Next, it presents the fundamental types of networks and describes the devices and topologies that create a network. This module also introduces the OSI model, best practices for safety when working with networks, and the seven-step troubleshooting model.

Module 2, "Infrastructure and Documentation," begins with a tour through a campus network's data rooms, from the ISP's entry point through to the users' endpoints. The module introduces best practices for managing network and cabling equipment and explains issues related to managing the environment in which networking equipment operates. This module also describes characteristics of documentation and explains how to create a network diagram that can be used in troubleshooting. It ends with a discussion on how to create and follow appropriate change management procedures in an enterprise network environment.

Module 3, "Addressing," describes addressing standards used by devices on a network at various layers of the OSI model, including MAC addresses at the data link layer, IP addresses at the network layer, and ports and sockets at the transport layer. It also explains how host names and domain names work. The module concludes with an introduction to commands used in troubleshooting networks.

Module 4, "Protocols," describes the functions of the core TCP/IP protocols, including TCP, UDP, IP, and others. It compares common encryption protocols, such as IPsec and SSL, and then explores common remote access protocols, such as SSH, RDP, and VPNs. The module finishes with a discussion of TCP/IP utilities used for network discovery and troubleshooting.

Module 5, "Cabling," discusses basic data transmission concepts, including throughput, bandwidth, multiplexing, and common transmission flaws. Next, it describes copper cables, fiber-optic cables, and Ethernet standards, comparing the benefits and limitations

of different networking media. The module then concludes with an examination of common cable problems and the tools used for troubleshooting those problems.

Module 6, “Wireless Networking,” examines how nodes exchange wireless signals and identifies potential obstacles to successful wireless transmission. The module explores wireless technologies that support the IoT (Internet of Things). It then describes WLAN (wireless LAN) architecture and specifies the characteristics of popular WLAN transmission methods. In this module, you will also learn how to install and configure wireless access points and clients, manage wireless security concerns, and evaluate common problems experienced with wireless networks.

Module 7, “Network Architecture,” takes a journey through the progression of abstraction in network architecture. It begins with a description of switch management and a comparison of three-tiered and two-tiered (spine-and-leaf) switch architectures. After some discussion of SDN (software-defined networking) and SAN (storage area network) technologies, the module presents common virtual network connection types and the concept of NFV (Network Functions Virtualization). It then identifies features and benefits of cloud architecture, connectivity, and automation. The module concludes with a discussion of key network availability concepts.

Module 8, “Segmentation,” explores the advantages and methods of network segmentation. The module examines the purposes of subnets and their calculations. It then describes techniques for segmenting with VLANs and explains related, advanced features of switches, including VLAN management.

Module 9, “Wide Area Networking,” expands your knowledge beyond the LAN with a discussion of WAN (wide area network) concepts and technologies. The module explores how routers work and how various internal and external gateway protocols select and manage routes between networks. The module follows the progression of a fictional company to compare WAN connectivity options, including DSL, cable broadband, leased lines, MPLS (Multiprotocol Label Switching), cloud connectivity options, and SD-WAN (software-defined WAN) so you’ll understand how each technology works and what makes each one unique. It then explores common wireless WAN technologies. The module concludes with a discussion of common Internet connectivity issues and interface configuration problems.

Module 10, “Risk Management,” covers common security risks and vulnerabilities on a network, including risks associated with people, technology, and malware infections. Here you’ll also learn how to assess a network’s weaknesses, how to apply appropriate physical security measures, and how to harden devices on the network. Finally, this module teaches you about the kinds of information you should include in security policies for users.

Module 11, “Security in Network Design,” examines methods for hardening router and switch configurations, followed by an exploration of common security devices specifically designed to protect a network. The module breaks down AAA (authentication, authorization, and accounting) processes that control users’ access to network resources and looks closely at the partnership between authentication and directory services.

Module 12, “Performance and Recovery,” presents basic network management concepts and describes how to utilize system and event logs to collect network data. It then explores methods of using this information to evaluate, monitor, manage, and optimize network performance. The module closes with a discussion of threats to network availability and components of a reliable disaster recovery plan and a defensible incident response plan.

Certification

Each main section of a module begins with a list of all relevant CompTIA Network+ objectives covered in that section. This unique feature highlights the important information at a glance and helps you better anticipate how deeply you need to understand the concepts covered.

Total Solutions for Networking

To access additional course materials, please visit www.cengage.com. At the www.cengage.com home page, search for the ISBN of your title (from the back cover of your book) using the search box at the top of the page. This will take you to the product page where these resources can be found.

State of the Information Technology (IT) Field

Organizations depend on computers and information technology to thrive and grow. Globalization, or connecting with customers and suppliers around the world, is a direct result of the widespread use of the Internet. Rapidly changing technology further affects how companies do business and keeps the demand for skilled and certified IT workers strong across industries. Every sector of the economy requires IT professionals who can establish, maintain, troubleshoot, and extend their business systems.

The latest Occupational Outlook Handbook from the Bureau of Labor Statistics (part of the U.S. Department of Labor) reports there were more than 370,000 network and computer systems administrator positions in 2019, the most recent year for which this information is available, with a predicted increase of 4 percent between 2019 and 2029. Median pay for jobs in this sector is over $83,000 annually. A somewhat more advanced job role in the same vein is computer network architect with over 160,000 jobs in 2019, a growth rate of about 5 percent, and a median income of over $112,000 annually. This median pay is the highest of all computer and IT occupations tracked by this site that only require a bachelor's degree, even more than people working as information security analysts. You can find more information about these and related job roles at bls.gov/ooh. Overall, people employed in computer and IT occupations make a median wage over $88,000 annually with projected growth of more than 530,000 jobs by 2029.

In any industry, a skilled workforce is important for continually driving business. Finding highly skilled IT workers can be a struggle for employers, given that technologies continue to change quickly. With such a short product life cycle, IT workers must strive to keep up with these changes and continually bring value to their employers.

Certifications

Different levels of education are required for the many jobs in the IT industry. While the level of education and type of training required varies from employer to employer, the need for qualified technicians remains a constant. As the industry continues to evolve, many employers prefer candidates who already have the skills to implement these new technologies. Companies are relying increasingly on technical certifications to adequately identify the quality and skill qualifications of a job applicant, and these certifications can offer job seekers a competitive edge over other applicants.

Certifications fall into one of two categories:

Vendor-neutral certifications are those that test for the skills and knowledge required in industry job roles and do not subscribe to a vendor's specific technology solutions. Some examples of vendor-neutral certifications include all the CompTIA certifications (comptia.org), Project Management Institute's certifications (pmi.org), and ISACA's certifications (isaca.org).

Vendor-specific certifications validate the skills and knowledge necessary to be successful while utilizing a specific vendor's technology solution. Some examples of vendor-specific certifications include those offered by Microsoft (microsoft.com), AWS (aws.amazon.com), Red Hat (redhat.com), Oracle (education.oracle.com), and Cisco (learningnetwork.cisco.com).

As employers struggle to fill open IT positions with qualified candidates, certifications are a means of validating the skill sets necessary to be successful within organizations. In most careers, salary and compensation are determined by experience and education, but in the IT field, the number and type of certifications an employee earns also determine salary and wage increases. For example, according to CompTIA, the U.S. Department of Defense and companies such as Apple, Verizon, Dell, HP, and Intel recommend or require their networking technicians attain CompTIA Network+ certification. Global Knowledge reports that certified IT staff earn, on average, 8 percent more than non-certified IT staff. In fact, according to the same report, being certified and adding new certifications is a lifestyle for a majority of IT professionals. Eighty-seven percent of all respondents already hold one certification, nearly 40 percent said they earned their most recent certification in the previous six months, and those with six or more certifications make, on average, $13,000 more than someone with only one certification.

Certification provides job applicants with more than just a competitive edge over their noncertified counterparts competing for the same IT positions. Some institutions of higher education grant college credit to students who successfully pass certification exams, moving them further along in their degree programs. Certification also gives individuals who are interested in careers in the military the ability to move into higher positions more quickly.

Career Planning

Finding a career that fits your personality, skill set, and lifestyle is challenging and fulfilling, but can often be difficult. What are the steps you should take to find that dream career? Is IT interesting to you? Chances are, if you are reading this course, this question has already been answered. What is it about IT that you like? The world of work options in the IT industry is vast. Some questions to ask yourself: Are you a person who likes to work alone, or do you like to work in a group? Do you like speaking directly with customers, or do you prefer to stay behind the scenes? Does your lifestyle encourage a lot of travel, or do you prefer to stay in one location? All these factors influence your job decisions, and all these preferences can find a purpose in IT. Inventory assessments are a good first step to learning more about yourself, your interests, work values, and abilities. A variety of websites can offer assistance with career planning and assessments.

What's New with CompTIA Network+ Certification

With its N10-008 Network+ exam, CompTIA has emphasized foundational network concepts and the latest network technologies that can serve as a launching pad for a career in networking, security, cloud, or other specialties. There's a stronger emphasis on security, virtualization, network architecture, and troubleshooting than in past versions of the exam. Some objectives have been added, updated, or expanded, such as coverage of SDN (software-defined networking), SD-WAN (software-defined wide area network), network interface configuration, database protocols, and risk management. Some older technologies have been dropped from the objectives.

As with the previous Network+ exam, the N10-008 version includes many scenario-based questions. Mastering, rather than simply memorizing, the material in this course will help you succeed on the exam and on the job.

Here are the domains covered on the new CompTIA Network+ exam:

Domain

% of Examination

Domain 1.0 Networking Fundamentals 24%

Domain 2.0 Network Implementations 19%

Domain 3.0 Network Operations 16%

Domain 4.0 Network Security 19%

Domain 5.0 Network Troubleshooting22%

Course Learning Outcomes (CLO's)

This course assumes you have mastered the knowledge and skills covered in the CompTIA A+ certification objectives. Using and supporting workgroups and sharing folders and files are part of this content. If you need to learn how folder and file sharing and workgroups are configured and supported, see CompTIA A+ Guide to IT Technical Support by Jean Andrews, Joy Dark, and Jill West.

Test Out and Comptia Objectives
https://hs.testout.com/hubfs/Teaching-Aids/Network-Pro/v6/objective-mappings-testout-network-pro-enus-6_0_x.pdf

ACRONYM	SPELLED OUT
MIMO	Multiple Input, Multiple Output
MU-MIMO	Multiuser - Multiple Input, Multiple Output
MOU	Memorandum of Understanding
MPLS	Multiprotocol Label Switching
MTBF	Mean Time Between Failure
MT-RJ	Mechanical Transfer - Registered Jack
MTTR	Mean Time to Repair
MTU	Maximum Transmission Unit
MX	Mail Exchange
NAC	Network Access Control
NAS	Network Attached Storage
NAT	Network Address Translation
NDA	Non-Disclosure Agreement
NFV	Network Function Virtualization
NGFW	Next-Generation Firewall
NIC	Network Interface Card
NS	Name Server
NTP	Network Time Protocol

ACRONYM	SPELLED OUT
SFP	Small Form-factor Pluggable
SFTP	Secure File Transfer Protoc
SIEM	Security Information and E Management
SIP	Session Initiation Protocol
SLA	Service Level Agreement
SLAAC	Stateless Address Auto-Configuration
SMB	Server Message Block
SMTP	Simple Mail Transfer Protoc
SNMP	Simple Network Manageme Protocol
SOA	Start of Authority
SOHO	Small Office Home Office
SQL	Structured Query Language
SRV	Service Record
SSD	Solid-State Drive
SSH	Secure Shell
SSID	Service Set Identifier
SSL	Secure Sockets Layer
SSO	Single Sign-On

OID	Object Identifier
OSI	Open Systems Interconnection
OSPF	Open Shortest Path First
OTDR	Optical Time Domain Reflectometer
PaaS	Platform as a Service
PAN	Personal Area Network
PAT	Port Address Translation
PDU	Power Distribution Unit
PoE	Power over Ethernet
POP3	Post Office Protocol version 3
PSK	Pre-Shared Key
PTR	Pointer Record
QoS	Quality of Service
QSFP	Quad Small Form-factor Pluggable
RA	Router Advertisements
RADIUS	Remote Authentication Dial-In User Service
RAID	Redundant Array of Inexpensive (or Independent) Disks
RDP	Remote Desktop Protocol
RF	Radio Frequency
RFC	Request for Comment
RG	Radio Guide
RIP	Routing Internet Protocol
RJ	Registered Jack
RPO	Recovery Point Objective
RSSI	Received Signal Strength Indication
RTO	Recovery Time Objective
RTSP	Real Time Streaming Protocol
SaaS	Software as a Service
SAN	Storage Area Network
SC	Standard Connector/Subscriber Connector
SCADA	Supervisory Control and Data Acquisition
SDN	Software-Defined Network
SDWAN	Software-Defined WAN
ST	Straight Tip or Snap Twist
STP	Spanning Tree Protocol
SYSLOG	System Log
TACACS+	Terminal Access Controller Access Control System Plus
TCP	Transmission Control Protoc
TFTP	Trivial File Transfer Protocol
TIA/EIA	Telecommunications Industr Association/Electronic Indus Alliance
TKIP	Temporal Key Integrity Protc
TLS	Transport Layer Security
TTL	Time to Live
TX/RX	Transmit and Receive
UDP	User Datagram Protocol
UPC	Ultra-Physical Contact
UPS	Uninterruptible Power Suppl
URL	Uniform Resource Locator
USB	Universal Serial Bus
UTP	Unshielded Twister Pair
VIP	Virtual IP
VLAN	Virtual Local Area Network
VM	Virtual Machine
VNC	Virtual Network Computing
vNIC	virtual Network Interface Ca
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network
VRRP	Virtual Router Redundancy Protocol
WAN	Wide Area Network
WAP	Wireless Access Point
WDM	Wavelength Division Multiple
WLAN	Wireless Local Area Networ
WPA	WiFi Protected Access

Network+ Proposed Hardware and Software List

CompTIA has included this sample list of hardware and software to assist candidates as they prepare for the Network+ exam. This list may also be helpful for training companies that wish to create a lab component for their training offering.
The bulleted lists below each topic are sample lists and are not exhaustive.

EQUIPMENT

- Optical and copper patch panels
- Punchdown blocks
- Layer 2 switch
- Layer 3 switch
- PoE switch
- Router
- Firewall
- VPN headend
- Wireless access point
- Mediaconverters

Basic laptops that support virtualization

- Media converters
- VoIP system (including a phone)

SPARE HARDWARE

- NICs
- Power supplies
- GBICs
- SFPs
- Managed switch
- Wireless access point
- UPS
- PoE injector

SPARE PARTS

- Patch cables
- RJ11 connectors
- RJ45 connectors, modular jacks
- Unshielded twisted pair cable spool
- Coaxial cable spool
- F connectors
- Fiber connectors
- Antennas
- Bluetooth/wireless adapters
- Console cables (RS-232 to Tablet/cell phone USB serial adapter)

TOOLS

- Telco/network crimper
- Cable tester
- Punchdown tool
- Cable stripper
- Coaxial crimper
- Wire cutter
- Tone generator
- Fiber termination kit
- Optical power meter

SOFTWARE

- Protocol analyzer/packet capture
- Terminal emulation software
- Linux OS/Windows OS
- Software firewall
- Software IDS/IPS
- Network mapper
- Hypervisor software
- Virtual network environment
- WiFi analyzer
- Spectrum analyzer
- Network monitoring tools
- DHCP service
- DNS service
- NetFlow analyzer
- TFTP server
- Firmware backups for upgrades

OTHER

- Sample network documentation
- Sample logs
- Defective cables
- Cloud network diagrams

[1] .2 Explain the characteristics of network topologies and network types.
[2] .8 Summarize cloud concepts and connectivity options.
[3] .2 Explain the purpose of organizational documents and policies.
[4] .5 Given a scenario, troubleshoot general networking issues.

Grading Scale

Grading Scale

GRADING SCALE

Grade Percentages Grades Percentage of Final Grades

90 - 100% = A	Tests 45%
80 - 89% = B	Quizzes 15%
70 - 79% = C	Homework 30%
60 - 69% =D	Participation 10%
0 - 59% = F	

Grade Breakdown by Assignment Type

1.0 INTRODUCTION

1.1 NETWORK PRO INTRODUCTION

4.2 APIPA AND ALTERNATE ADDRESSING

4.3 DHCP

4.4 DHCP RELAY

4.11 TROUBLESHOOT DNS

- 4.11.1 DNS TROUBLESHOOTING (4:47)
- 4.11.2 DNS TROUBLESHOOTING FACTS
- 4.11.3 EXAMINING DNS ATTACKS (11:57)
- 4.11.4 USE NSLOOKUP (3:38)
- 4.11.5 USE DIG (5:28)
- 4.11.6 EXPLORE NSLOOKUP
- 4.11.7 PRACTICE QUESTIONS

5.0 ETHERNET

5.1 ETHERNET

- 5.1.1 ETHERNET ARCHITECTURE (10:03)
- 5.1.2 ETHERNET FACTS
- 5.1.3 ETHERNET SPECIFICATIONS (3:59)
- 5.1.4 ETHERNET SPECIFICATIONS FACTS
- 5.1.5 RECONNECT TO AN ETHERNET NETWORK
- 5.1.6 PRACTICE QUESTIONS

5.2 CONNECT NETWORK DEVICES

- 5.2.1 CONNECT DEVICES (7:20)
- 5.2.2 DEVICE CONNECTION FACTS
- 5.2.3 CONNECT NETWORK DEVICES
- 5.2.4 PRACTICE QUESTIONS

5.3 TROUBLESHOOT PHYSICAL CONNECTIVITY

- 5.3.1 TROUBLESHOOT PHYSICAL NETWORK TOPOLOGY (5:33)
- 5.3.2 PHYSICAL NETWORK TOPOLOGY TROUBLESHOOTING FACTS

7.1.5 CONNECT TO AND SECURE A SWITCH - GUI (2:57)

7.1.6 SECURE A SWITCH

7.1.7 CISCO IOS BASICS (8:35)

7.1.8 PRACTICE QUESTIONS

7.2 BASIC SWITCH CONFIGURATION

7.2.1 VLAN OVERVIEW (11:23)

7.2.2 VLAN FACTS

7.2.3 CONFIGURE SWITCH IP AND VLAN - GUI (3:59)

7.2.4 CONFIGURE SWITCH IP AND VLAN - GUI

7.2.5 CREATE VLANS - GUI (3:26)

7.2.6 CREATE VLANS - GUI

7.2.7 CONFIGURE SWITCH IP AND VLAN - CLI (4:43)

7.2.8 CLI SWITCH IP CONFIGURATION FACTS

7.2.9 CONFIGURE SWITCH IP SETTINGS - CLI

7.2.10 CONFIGURE MANAGEMENT VLAN SETTINGS - CLI

7.2.11 PRACTICE QUESTIONS

7.3 SWITCH PORTS

7.3.1 SWITCH PORT CONFIGURATIONS (6:57)

7.3.2 SWITCH PORT CONFIGURATION FACTS

7.3.3 CONFIGURE TRUNKING (2:56)

7.3.4 CONFIGURE TRUNKING

7.3.5 CONFIGURE PORT AGGREGATION (2:50)

7.3.6 CONFIGURE PORT AGGREGATION

7.3.7 ENABLE JUMBO FRAME SUPPORT (2:36)

7.3.8 ENABLE JUMBO FRAME SUPPORT

7.3.9 SWITCH PORT FEATURES (10:24)

8.5 CLOUD CONCEPTS AND CONNECTIVITY

- 8.5.1 CLOUD MODELS (3:47)
- 8.5.2 CLOUD DELIVERY METHODS (6:33)
- 8.5.3 CLOUD FACTS
- 8.5.4 VIRTUAL PRIVATE NETWORKS (8:27)
- 8.5.5 VIRTUAL PRIVATE NETWORKS FACTS
- 8.5.6 IPSEC VIRTUAL PRIVATE NETWORKS FACTS
- 8.5.7 PRACTICE QUESTIONS

8.6 INTERNET OF THINGS (IOT)

- 8.6.1 INTERNET OF THINGS (11:01)
- 8.6.2 SMART DEVICES (7:03)
- 8.6.3 INTERNET OF THINGS FACTS
- 8.6.4 CONFIGURE SMART DEVICES
- 8.6.5 IOT SECURITY CHALLENGES (7:53)
- 8.6.6 SCAN FOR IOT WITH NMAP (3:24)
- 8.6.7 SCAN FOR IOT DEVICES
- 8.6.8 PRACTICE QUESTIONS

9.0 WIRELESS NETWORKING

9.1 WIRELESS CONCEPTS AND STANDARDS

- 9.1.1 RADIO FREQUENCY WIRELESS (11:28)
- 9.1.2 WIRELESS ARCHITECTURE (7:52)
- 9.1.3 WIRELESS ARCHITECTURE FACTS
- 9.1.4 WIRELESS INFRASTRUCTURE FACTS
- 9.1.5 WIRELESS STANDARDS (12:55)
- 9.1.6 WIRELESS STANDARDS FACTS

9.5 WIRELESS SECURITY

- 9.5.1 WIRELESS SECURITY PART 1 (8:10)
- 9.5.2 WIRELESS SECURITY PART 2 (6:56)
- 9.5.3 WIRELESS SECURITY FACTS
- 9.5.4 WIRELESS ATTACKS (9:40)
- 9.5.5 WIRELESS ATTACK FACTS
- 9.5.6 SECURE A WIRELESS NETWORK (5:41)
- 9.5.7 SECURE AN ENTERPRISE WIRELESS NETWORK
- 9.5.8 ENABLE WIRELESS INTRUSION PREVENTION
- 9.5.9 CONFIGURING A CAPTIVE PORTAL (6:21)
- 9.5.10 CONFIGURING A CAPTIVE PORTAL
- 9.5.11 CREATING A GUEST NETWORK FOR BYOD (7:30)
- 9.5.12 CREATING A GUEST NETWORK FOR BYOD
- 9.5.13 CONFIGURE A SECURE EMAIL ACCOUNT ON MOBILE DEVICE
- 9.5.14 PRACTICE QUESTIONS

9.6 WIRELESS TROUBLESHOOTING

- 9.6.1 WIRELESS COMMUNICATIONS TROUBLESHOOTING PART 1 (7:56)
- 9.6.2 WIRELESS COMMUNICATIONS TROUBLESHOOTING PART 2 (14:52)
- 9.6.3 TROUBLESHOOT WIRELESS CONNECTIONS (6:24)
- 9.6.4 WIRELESS NETWORK TROUBLESHOOTING FACTS
- 9.6.5 OPTIMIZE WIRELESS NETWORKS (4:39)
- 9.6.6 OPTIMIZE A WIRELESS NETWORK
- 9.6.7 EXPLORE WIRELESS NETWORK PROBLEMS
- 9.6.8 TROUBLESHOOT WIRELESS NETWORK PROBLEMS

11.4 MONITORING

11.5 ORGANIZATION POLICIES

11.6 REDUNDANCY AND HIGH AVAILABILITY

12.0 NETWORK SECURITY

12.1 SECURITY CONCEPTS

- 12.1.1 SECURITY CONCEPTS (7:39)
- 12.1.2 SECURITY CONCEPTS FACTS
- 12.1.3 CONFIGURE PERMISSIONS (9:39)
- 12.1.4 SECURE PROTOCOLS (8:03)
- 12.1.5 SCAN FOR UNSECURE PROTOCOLS (4:52)
- 12.1.6 SECURE PROTOCOL FACTS
- 12.1.7 DEFENSE IN DEPTH (9:40)
- 12.1.8 DEFENSE IN DEPTH FACTS
- 12.1.9 CONFIGURE A HONEYPOT (3:24)
- 12.1.10 PRACTICE QUESTIONS

12.2 RISK MANAGEMENT

- 12.2.1 RISK MANAGEMENT (6:54)
- 12.2.2 RISK MANAGEMENT FACTS
- 12.2.3 PENETRATION TESTING (2:41)
- 12.2.4 PENETRATION TESTING FACTS
- 12.2.5 SECURITY INFORMATION AND EVENT MANAGEMENT (4:35)
- 12.2.6 SECURITY INFORMATION AND EVENT MANAGEMENT FACTS
- 12.2.7 VULNERABILITY ASSESSMENT (5:10)
- 12.2.8 CONDUCT A VULNERABILITY SCAN (3:17)
- 12.2.9 VULNERABILITY ASSESSMENT FACTS
- 12.2.10 PRACTICE QUESTIONS

12.3 PHYSICAL SECURITY

- 12.3.1 PHYSICAL SECURITY (8:14)
- 12.3.2 PHYSICAL SECURITY FACTS

I have not added the labs to this list yet. If you want to get started here is what you can start on.

Overview of Learning Activities & Assessments

	WEEK	Due Dates
	Week 1	Jan 28
	Week	Jan 28

1	
Week 1	Aug 27th
Week 1	Aug 27th
Week 1	Aug 27th
Week 1	Aug 27th
Week 1	Aug 27th
Week 1	Aug 27th
Week 2	Sept 3
Week 2	Sept 3
Week 2	Sept 3

Week 2	Sept 3
Week 3	Sept 10
Week 3	Sept 10
Week 3	Sept 10
Week 3	Sept 10
Week 4	Sept 17
Week 4	Sept 17
Week 4	Sept 17
Week 4	Sept 17
Week 5	Sept 24th
Week	Sept 24th

	5	
	Week 5	Sept 24th
	Week 5	Sept 24th
	Week 5	Sept 24th
	Week 6	October 1st
	Week 6	October 1st
	Week 6	October 1st
	Week 6	October 1th
	Week 6	October 1th
	Week 6	October 1th
	Week 7	October 8th
	Week 7	October 8th

Week 8	October 15th
Week 8	October 15th
Week 8	October 15th
Week 8	October 15th
Week 8	October 15th
Week 9	October 22nd
Week 9	October 22nd
Week 9	October 22nd
Week 9	October 22th
Week 9	October 22th
Week 9	October 22th
Week	October 29th

10	
Week 10	October 29th
Week 10	October 29th
Week 10	October 29th
Week 11	Nov 5th
Week 11	Nov 5th
Week 11	Nov 5th
Week 11	Nov 5th
Week 11	Nov 5th
Week 11	Nov 5th
Week 11	Nov 5th
Week 12	Nov 12th
Week 12	Nov 12th

Week 12	Nov 12th
Week 12	Nov 12th
Week 13	November 19th
Week 13	November 19th
Week 13	November 19th
Week 13	November 19th
Week 13	November 19th
Week 13	November 19th
Week 14	December 3rd
Week 14	December 3rd
Week 14	December 3rd
Week 14	December 3rd

	Week 15	December 10th
	Week 15	December 10th
	Week 15	
	Week 15	May 16th
	Week 15	May 16th

Make-Up and Late Assignments Policy

There is a 10% late penalty for late assignments after the due date. I do not have an option for make up work. I suggest that you do your work on time or before the due date, I understand that everyone has a family and work, plus college work that needs to be done. If you work ahead in Cengage then your work will not be too much if your personal life or work life gets really hectic you should be able to keep up with the course work.

Participation and Engagement Policy

I give extra credit to those that participate and are engaged in the course. If your online only I have some extra credit options that you can do as well that could help you with your grade. If your having issues I would appreciate it if you could come talk to me and not just drop the class first. I do understand that everyone has issues, and I can alter your work to help you with emergencies. However, if your in this class to get the

certification and pass the certification exam at the end of the course I will suggest you do all the assignments in the course as that will ensure your ready for the exam at the end of the course.

Lab Policies and Expectations

All work is to be complete by the due date if not you will be assessed a 10% penalty.

Additional Course Policies

Domain	% of Examination
Domain 1.0 Networking Fundamentals	24%
Domain 2.0 Network Implementations	19%
Domain 3.0 Network Operations	16%
Domain 4.0 Network Security	19%
Domain 5.0 Network Troubleshooting	22%

Key Semester Calendar Dates

Event	Semester Dates

Last Day to Drop with 100% Refund	Friday, February 2, 2024
Spring Break	**March 18th - 23rd**
Last Day to Withdraw	Friday, April 19, 2024
Final Examinations	May 13th - 18th
Last Day of Semester	Saturday, May 18, 2024

*NOTE: Failure to attend and complete assignments by required due dates may result in a student being administratively withdrawn (AW). Receiving an AW grade does **not release a student from financial responsibility** for the course.

Academic Integrity

Rose State College expects students to understand and to follow basic standards of honesty and integrity. Some common violations of these basic standards of academic integrity include but are not limited to, plagiarism, cheating on tests and examinations, **presenting one's own work completed for one course as original work for another**, and other forms of dishonest performance on college assignments, as explained below.

Plagiarism means the use of the thoughts, ideas, words, phrases or research of another person or source as one's own without explicit and accurate credit to the original author.

Cheating on examinations of any kind (quizzes, midterms, finals, etc.) includes copying another student's answers, exchanging information, using notes or books unless expressly permitted to do so by the instructor, or gaining access to examinations prior to the actual taking of such examinations.

Other examples of academic dishonesty include, but are not limited to, copying or preparing another person's work; or buying prepared papers.

NOTE: Assisting anyone** to engage in any of the violations described above **qualifies as academic dishonesty.

Student Technology Skills and Expectations

Hardware Lab Requirements

Ninety-two percent of all projects can be completed with only a Windows 10 computer with administrative privileges to install software, a smartphone, and a home network with permission from the network owner to perform scanning operations. Most of the other projects require a Bluetooth device (one project), a second computer (part of one project), and cabling supplies (three projects). Detailed hardware requirements include the following:

- Each student needs a computer with at least 8 GB of RAM (preferably 12 GB), a recent Intel or AMD processor, and a minimum of 150 GB of free space on the hard disk to support all the VM projects. Many projects require workstations to have a wired connection to a network, and other projects need a wireless connection.
- Some projects require the use of a second computer to create a network connection between computers—all but one of these projects can be successfully completed between a physical host computer and one or more VMs installed on that host from earlier projects. For part of one project, a second physical computer is required, and this system can be an older device, such as Windows 7, or a different OS, such as macOS.
- For projects with physical transmission media, students require a basic networking toolkit that includes the following cable-making supplies: 1–2 feet of Cat 5 or better cabling, at least five RJ-45 plugs, an RJ-45 data/phone jack, a wire cutter or snips, a wire stripper, a crimper, and a punchdown tool.
- For projects with wireless transmission, each class (or each group in the class) should have a wireless SOHO router capable of 802.11n or better transmission, compatible wireless NICs in the student workstations, and a patch cable. For students learning at home, a typical home network is sufficient for this requirement providing the student has administrative access to the SOHO router and, if they don’t own the network, written permission from the network owner to conduct scans and penetration testing.
- Some projects require each student to have a smartphone (Android or iPhone). Students can do these projects in pairs for those students who don’t own a smartphone.
- One project requires a Bluetooth device, such as a Bluetooth speaker, Bluetooth earbuds, or a Bluetooth-enabled car system.
- One project optionally requires a cable modem for the class to examine.

- Many projects require Internet access with a modern browser.

Read This Before You Begin

The Applying Concepts activities, Hands-On Projects, and Capstone Projects in this course help you to apply what you have learned about computer networking. Although some modern networking components can be expensive, the projects aim to use widely available and moderately priced hardware and software. The following section lists the minimum hardware and software requirements that allow you to complete all the projects in this text (not including the Lab Manual labs). In addition to the following requirements, students must have administrator privileges on their workstations and, for some projects, on a second workstation or device (such as a smartphone), to successfully complete the projects.

Software Lab Requirements

Most projects are written for workstations running Windows 10. Software requirements include the following:

- Updated Windows 10 Professional (64-bit), Education (64-bit), or Home (64-bit), although Windows 10 Pro is preferred. Many of the projects can be adapted to work on Linux or macOS workstations.
- The latest version of Chrome, Firefox, or Edge web browser.
- A hypervisor—most projects are written for Oracle VirtualBox (any edition of Windows) or Client Hyper-V (Windows 10 Professional/Education only), and they can be adjusted for VMware Workstation Player.
- An installation image for Windows.
- Steps to download installation images for other OSs are given in the projects. These OSs include Ubuntu Desktop, Ubuntu Server, and Kali Linux.
- Some projects use cloud resources in AWS (Amazon Web Services). AWS Educate offers a plethora of helpful and free resources for schools, instructors, and students. At the time of this writing, students can only join AWS Educate when the instructor posts an invitation link in the LMS (learning management system) or when the instructor sends an email invite from an AWS Educate classroom, which provides students with free credits and tools for instructors to help them with their work in AWS. Instructors can allocate free credits to students for every class, and it

does not count against their free credits in their own accounts. Creating an instructor's AWS Educate account is easy and free. Creating a classroom in AWS Educate is even easier, and the instructor can allocate free AWS credits for students from the dashboard. For more information, visit aws.amazon.com/education/awseducate/. If you have questions or need assistance, contact AWS Educate staff or email the author at jillwestauthor@gmail.com.

- Other software that will be downloaded include LastPass, Packet Tracer, Wireshark, ZenMap, Nmap, IP Scanner, PuTTY, TotuSoft's LAN Speed Test, TamoSoft's Throughput Test, iPerf, PRTG Network Monitor, Windows Subsystem for Linux, Advanced Port Scanner, Wi-Fi analyzer app (on smartphone), and THC-IPv6 (in Kali Linux VM).

Cisco's Packet Tracer is now available free to the public. Instructions for downloading and installing Packet Tracer are given in the first Packet Tracer project in Module 2. Abbreviated instructions are repeated here for convenience, as some instructors might want to preview the emulator:

1. Go to netacad.com/courses/packet-tracer or search for packet tracer site:netacad.com for the latest link. Enter your name, email, and text verification to enroll in the course. Check your email to confirm your email address.
2. Inside the course under Introductory Chapter, click Student Support and Resources. Scroll down and click Download and install the latest version of Packet Tracer. Choose the correct version for your computer. After the download is complete, install Packet Tracer. When the installation is complete, run Cisco Packet Tracer. When Packet Tracer asks if you would like to run multi-user, click No.
3. When Packet Tracer opens, sign in with your Networking Academy account that you just created. If you see a Windows Security Alert, allow access through your firewall. Cisco Packet Tracer opens.

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email invite from an AWS Educate classroom, which provides students with free credits and tools for instructors to help them with their work in AWS. Instructors can allocate free credits to students for every class, and it does not count against their free credits in their own accounts. Creating an instructor's AWS Educate account is easy and free. Creating a classroom in AWS Educate is even easier, and the instructor can allocate free AWS credits for students from the dashboard. For more information, visit aws.amazon.com/education/awseducate/. If you have questions or need assistance, contact AWS Educate staff or email the author at jillwestauthor@gmail.com.

Other software that will be downloaded include LastPass, Packet Tracer, Wireshark, ZenMap, Nmap, IP Scanner, PuTTY, TotuSoft's LAN Speed Test, TamoSoft's Throughput Test, iPerf, PRTG Network Monitor, Windows Subsystem for Linux, Advanced Port Scanner, Wi-Fi analyzer app (on smartphone), and THC-IPv6 (in Kali Linux VM).

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Go to netacad.com/courses/packet-tracer or search for packet tracer site:netacad.com for the latest link. Enter your name, email, and text verification to enroll in the course. Check your email to confirm your email address.

Inside the course under Introductory Chapter, click Student Support and Resources. Scroll down and click Download and install the latest version of Packet Tracer. Choose the correct version for your computer. After the download is complete, install Packet Tracer. When the installation is complete, run Cisco Packet Tracer. When Packet Tracer asks if you would like to run multi-user, click No.

When Packet Tracer opens, sign in with your Networking Academy account that you just created. If you see a Windows Security Alert, allow access through your firewall. Cisco Packet Tracer opens.

Technology Support/Help

Technical Support for Canvas

Canvas may be a new system for many of you in our course. It is very student friendly and easy to navigate ... plus, it is designed to provide great reminders to help students recognize key due dates and locate learning materials. If you would like some help learning more about Canvas (or if you get stuck on any of the tools), here are some help tips for you:

- Click the following link to see a variety of Canvas Videos (scroll down to find the videos for Students): Canvas Video Guide (Links to an external site.)
- Click the following link for the Canvas Student Guides for help with almost any feature of Canvas: Canvas Student Guide (Links to an external site.)
- **Click the "Help" icon for 24/7 help with Canvas via phone or chat** (icon is at the bottom of the far left navigation menu)

Other Technical Support

For Technical Assistance, use the Help link. You can find many resources that may help you find what you need, such as the Users Guide or Knowledge Base. Or if those don't help answer your question, you can use the link to contact the eLearn Helpdesk (Links to an external site.)

Academic Support Services & Resources

We have several services and resources to help our Rose State College students succeed...whether you are on campus or online. Click the following link to view our Student Resources webpage:

https://www.rose.edu/content/academics/student-resources/

The above link will connect you to the following resources and more:

- Learning Resources Center
- Our Rose State College Library

- “The Study” offered through our Humanities Department
- Computer Labs across campus
- Reading Lab
- Writing Lab
- Tutoring Center

ACADEMIC TESTING CENTER

Our Academic Testing administers and proctors class exams at the request of instructors for online, on-campus, and hybrid courses. If your instructor has required a proctored exam at our testing center, please click the following link to confirm Academic Testing's policies, location, and hours of operation.

Raider Alert (Campus Emergency Alerts)

Raider Alert is Rose State’s emergency notification system. It allows authorized Rose State officials to send information and instructions simultaneously through cell phones, text messaging, landline phones and email.

While you are automatically registered for Raider Alert when you come to Rose State College, we ask that you regularly confirm or update your contact information at **https://www.getrave.com/login/rose** to ensure we can contact you at a moment’s notice.

You can also receive Rose State College emergency text notifications on your phone by **texting the phrase RSCAlert to number 67283**. A confirmation will be sent back along with instructions on how to unsubscribe to Raider Alerts. Please note message and data rates may apply, depending on your phone provider’s plan.

Student Access Services

Rose State College complies with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Students with disabilities who seek accommodations must make their request by contacting Student Access Services (formerly the Office of

Disabilities Services), located in LRC 106 or call **(405)733-7373**. The student will be asked to provide documentation concerning the disability.

All accommodations must be approved by Student Access Services. Click on the following link for more information: (https://www.rose.edu/content/academics/student-services/student-access-services-formerly-disability-services).

Student Services & Resources

We have some great services and resources for our students. We encourage you to check out what is available at Rose State College to help with many areas of your life.

- Click "Help" at the bottom of the main Canvas menu to see multiple options such as:
    - The Raider Resource Guide
    - Student Support Quicklinks

- Click the following link to open our Student Services webpage which includes lots of great resources: https://www.rose.edu/content/academics/student-services/

- Visit The Diversity Center webpage for support for students of color and other underrepresented populations: https://www.rose.edu/content/academics/student-services/center-for-success-inclusion-diversity/

- Join the fun with our Student Clubs & Organizations: https://www.rose.edu/content/student-activities/clubs-organizations/

To contact various offices on campuses, including advisors, click this link to Helpful Campus Numbers (Links to an external site.)

Mental Health Resource

Rose State College (RSC) offers short-term counseling to current students and employees. The intake process and short-term counseling sessions are at **no charge** to

the student/employee. Counseling professionals in the Office of Special Services include licensed and license-eligible counselors.

Mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. Rose State College provides services available to assist you with addressing these and other concerns you may be experiencing. You can learn more about personal counseling and the broad range of confidential mental health services available on campus via http://www.rose.edu/personal-counseling or call (405) 733-7373.

Title IX

Professors are Responsible Employees under Title IX. Our College has obligations under federal law, so professors may not be able to keep things you tell them about sexual misconduct confidential. However, the College assures everyone that information disclosed will be kept as ***private*** as possible, and will **only be relayed to the necessary officials on campus**.

Changes to the Syllabus

The faculty member reserves the right to make changes to a published Syllabus if it is in the best interest of the educational development of the class. Any such changes will be announced as soon as possible.