

**COMPUTER REPAIR IV**

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## I. COURSE DESCRIPTION

Computer Repair IV is a full year study designed as a course to prepare the student for the Cisco Icnd 1 and Testout Cisco Pro Certification— measures your ability to perform real-world tasks based on the following topics:

- IP Routing Implementation
- OSPF Routing Configuration
- EIGRP Routing Configuration
- Access Control List Configuration
- Frame Relay Configuration
- NAT Configuration
- DHCP Server Configuration
- Router Security
- High Availability Configuration
- Switch Setup and Configuration
- Switch Interface Configuration
- TCP/IP Configuration
- VLAN Configuration
- InterVLAN Routing
- Spanning Tree Configuration
- Switch Security
- EtherChannel Configuration

Students of Computer Repair IV will study focuses on implementing, managing, protecting, and troubleshooting small to medium size enterprise branch networks

## II. Outline of Course

### PCTI Curriculum Unit 1 Planner

<b>Content Area:</b>	<b>Computer Repair IV</b>	<b>Grade(s)</b>	<b>12</b>
<b>Unit Plan Title:</b>	Cisco Networking Devices and Lans	<b>Time Frame</b>	<b>10 Weeks</b>
<b>Standard(s) Addressed</b>			
9.1.12.a.3, 9.1.12.b.2, 9.4.12.k.6, 9.4.12.k.24, 9.4.12.k.44, 9.4.12.k.59, 9.4.12.k.81, 9.4.12.k.11,9.4.12.k.12, 9.4.12.k.13, 9.4.12.k.14			
WHST.11-12.1.D. WHST.11-12.1.E, WHST.11-12.2.A,WHST.11-12.2.D, WHST.11-12.4,WHST.11-12.10			
RST.11-12.1. RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7. RST.11-12.8, RST.11-12.9, RST.11-12.10			
<b>Essential Questions (3-5)</b>			

1. What is the OSI model and why is it important in understanding networking?
2. What is the role of the subnet mask?
3. What is the function of a routing protocol?
4. What are the major modes of a cisco router?
5. What are the proper types of cables used while connecting cisco devices
6. How do you configure DNS, DHCP, and IP?

### **Anchor Text(s)**

**Cisco CCNA – Network Academy Book (Cisco press)**

### **Informational Texts (3-5)**

#### Web Articles

- [The Osi model why it still matters](#)
- [Cisco - Routing Protocols - Cisco Systems, Inc](#)

#### Labsim

- Networking Concepts ( 2 articles)
- Cisco Devices (2 articles)
- Lan Implantations (1 article)

### **Expected Proficiencies/Career and Life Skills**

- Select and decide best equipment for purchasing
- Configure common internet protocols
- Implement a successful router installation

### **Writing Assessments (1-3)**

- Writing lab reports
- Writing evaluation reports
- Compare and contrast different cisco routers and their capabilities
- Construct a manual on accessing different cisco router modes

### **Resources**

- Cisco Netacad Website
- Testout's LabSim
- Blackboard
- PowerPoint
- Microsoft Word
- Instructional Videos
- Wikis
- Total Seminars Practice Exam software

- Career search engines (i.e. Careerbuilder)
- Knowledgebases
- Technical forums
- Adobe Encore
- Microsoft Visio

### PCTI Curriculum Unit 2 Planner

<b>Content Area:</b>	<b>Computer Repair IV</b>	<b>Grade(s)</b>	<b>12</b>
<b>Unit Plan Title:</b>	Wans & Subnetting	<b>Time Frame</b>	<b>10 Weeks</b>
<b>Standard(s) Addressed</b>			
<p>9.1.12.a.3,9.4.12.k.6,9.4.12.k.24,9.4.12.k.44,9.4.12.k.59,9.4.12.k.81,9.4.12.k.11,9.4.12.k.12,9.4.12.k.13,9.4.12.k.14</p> <p>WHST.11-12.1.D. WHST.11-12.1.E, WHST.11-12.2.A,WHST.11-12.2.D, WHST.11-12.4,WHST.11-12.10</p> <p>RST.11-12.1. RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7. RST.11-12.8, RST.11-12.9, RST.11-12.10</p>			
<b>Essential Questions (3-5)</b>			
<ol style="list-style-type: none"> <li>1. What is the role of Subnetting?</li> <li>2. What is the proper way to subnet and configure a network?</li> <li>3. What are the media types used by Wans?</li> <li>4. What is the purpose of PPP communication?</li> <li>5. What are the advantages of VLANs?</li> <li>6. What is spanning tree?</li> </ol>			

## **Anchor Text(s)**

Cisco CCNA – Network Academy Book (Cisco press)

## **Informational Texts (3-5)**

### **Web Articles**

- [Understanding Basic VLAN Configuration](#)
- [Understanding and Configuring Spanning Tree Protocol](#)

### **Labsim**

- **Wireless Networks (1 article)**
- **Subnetting (3 articles)**
- **Wan Implementation (1 article)**

## **Expected Proficiencies/Career and Life Skills**

- Install cabling and devices for a wan
- Setup and design vlans with spanning tree
- Create and design proper subnets

## **Writing Assessments (1-3)**

- Writing lab reports
- Writing evaluation reports
- Diagram a wan including subnets and vlans
- Research super subnets and why you would or would not use them

## **Resources**

- Testout's LabSim
- Cisco Netacad Website
- Blackboard
- PowerPoint
- Microsoft Word
- Instructional Videos
- Wikis
- Total Seminars Practice Exam software
- Career search engines (i.e. Careerbuilder)
- Knowledgebase
- Technical forums
- Adobe Encore
- Microsoft Visio

### PCTI Curriculum Unit 3 Planner

<b>Content Area:</b>	<b>Computer Repair IV</b>	<b>Grade(s)</b>	<b>12</b>
<b>Unit Plan Title:</b>	Routing & Troubleshooting	<b>Time Frame</b>	<b>10 Weeks</b>
<b>Standard(s) Addressed</b>			
<p>9.4.12.k.6,9.4.12.k.24,9.4.12.k.44,9.4.12.k.59,9.4.12.k.81,9.4.12.k.11,9.4.12.k.12,9.4.12.k.13,9.4.12.k.14</p> <p>WHST.11-12.1.D. WHST.11-12.1.E, WHST.11-12.2.A,WHST.11-12.2.D, WHST.11-12.4,WHST.11-12.10</p> <p>RST.11-12.1. RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7. RST.11-12.8, RST.11-12.9, RST.11-12.10</p>			
<b>Essential Questions (3-5)</b>			
<ol style="list-style-type: none"> <li>1. What are access list and how are they used?</li> <li>2. What are the difference between a routing protocol and a routed protocol?</li> <li>3. What are routing metrics?</li> <li>4. How do routers calculate distances between each other?</li> <li>5. Why are static routes important?</li> </ol>			

## Anchor Text(s)

Cisco CCNA – Network Academy Book (Cisco press)

## Informational Texts (3-5)

### Web Articles

- [Rings of Saturn](#)
- [Static vs. Dynamic Routing - Router Alley](#)

### Labsim

- Advanced switching ( 1 article)

## Expected Proficiencies/Career and Life Skills

- Successfully implement access lists
- Setup router metrics
- Calculate distances between router using different metrics

## Writing Assessments (1-3)

- Writing lab reports
- Writing evaluation reports
- Diagram different routing metrics showing how they calculate metrics
- Create a lab for other students that emphasizes troubleshooting

## Resources

- Testout's LabSim
- Cisco Netacad Website
- Blackboard
- PowerPoint
- Microsoft Word
- Instructional Videos
- Wikis
- Total Seminars Practice Exam software
- Career search engines (i.e. Careerbuilder)
- Knowledgebases
- Technical forums
- Adobe Encore
- Microsoft Visio

### PCTI Curriculum Unit 4 Planner

<b>Content Area:</b>	<b>Computer Repair IV</b>	<b>Grade(s)</b>	<b>12</b>
<b>Unit Plan Title:</b>	Ip Configuration and Security	<b>Time Frame</b>	<b>10 Weeks</b>
<b>Standard(s) Addressed</b>			
<p>9.1.12.e3,9.4.12.k.6,9.4.12.k.24,9.4.12.k.44,9.4.12.k.81,9.4.12.k.11,9.4.12.k.12,9.4.12.k.13, 9.4.12.k.14, 9.4.12.k.3</p> <p>WHST.11-12.1.D. WHST.11-12.1.E, WHST.11-12.2.A,WHST.11-12.2.D, WHST.11-12.4,WHST.11-12.10</p> <p>RST.11-12.1. RST.11-12.2, RST.11-12.3, RST.11-12.4, RST.11-12.5, RST.11-12.6, RST.11-12.7. RST.11-12.8, RST.11-12.9, RST.11-12.10</p>			
<b>Essential Questions (3-5)</b>			
<ol style="list-style-type: none"> <li>1. What are CIR and its importance?</li> <li>2. How does IPV6 improve routing?</li> <li>3. How do we configure dynamic NAT?</li> </ol>			

4. What Vpn technology is commonly used on web servers?
5. How do we setup switch port security on a network?
6. What is the most important method of protecting networking devices?

### **Anchor Text(s)**

Cisco CCNA – Network Academy Book (Cisco press)

### **Informational Texts (3-5) [career-related readings; journal articles, books, etc]**

#### Web Articles

- [IPv6 Security Issues – Concerns for Transition](#)
- [IT Consulting in a Wireless World](#)

#### Labsim

- Frame Relay (1 article)
- Advanced Tcp/ip (1 article)
- Network Security (3 articles)

### **Expected Proficiencies/Career and Life Skills**

- **Transition a network from IPV4 to IPV6**
- **Properly setup network security with vpns**
- **Properly setup network security on switch ports**

### **Writing Assessments (1-3)**

- Writing lab reports
- Writing evaluation reports
- Create and document a successful lan/wan setup
- Research Prove why vpn technology is the most secure network type

### **Resources (software, videos, career exploration-related activities)**

- Testout's LabSim
- Cisco Netacad Website
- Blackboard
- PowerPoint
- Microsoft Word
- Instructional Videos
- Wikis
- Total Seminars Practice Exam software
- Career search engines (i.e. Careerbuilder)
- Knowledgebases
- Technical forums
- Adobe Encore
- Microsoft Visio

### III. Methods of Student Evaluation (assessment and evaluation)

Assessment in a vocational area can be divided into four general categories—formal (graded), informal (ungraded), certification, and practical application.

Formal Assessments:

- Multiple choice quizzes
- Do Now quizzes
- Research Simulated Tasks
- Lab Reports
- Oral presentations
- Notebook checks
- Tests

Some of the informal assessments include, *but are not limited to*:

- Daily closure discussion – At the end of each day, the instructor and students discuss the day's topic and provide insight and ask questions
- Blackboard sharing – Students are always working in groups. At the end of lab time, students are to exchange information, project data, lab reports, et al with their group members via Blackboard

Certification – The ultimate goal for the end of the year is to acquire certification. Currently, Computer Repair students will be taking the Cisco Pro certification provided by TestOut Corporation.

Practical application is the most important component to any vocational area. It demonstrates that a student can put the learned information into action by applying it in a real-world scenario. Some practical application assessments include, *but are not limited to*:

- Practical labs – Students will perform hands-on activities with the equipment based on a given set of instructions.
- Projects – There will be a project each marking period. Successful completion of the project demonstrates that the students can practically apply most (or all) of the unit's concepts

Students will be evaluated in accordance with general grading policies listed in the student handbook.

- Tests – 40%
- Quizzes – 20%

- Projects/Labs – 20%
- Participation – 10%
- Homework/Notebook – 10%

**IV. Instructional Strategies Based on Instructional Goals**

A combination of various instructional strategies will be used based on students' learning styles and subject content. Such strategies include:

- Collaborating with teammates to complete labs and projects
- Reading and discussing current trends in the industry
- Watching instructional videos
- Performing hands on exercises in a real-world environment
- Performing lab simulation exercises akin to real-world scenarios
- Develop strategies to troubleshoot a computer problem
- Develop critical thinking skills
- Instructional delivery with PowerPoint presentations
- Providing supplement notes
- Collaborative projects

**V. Scope and Sequence**

<b>SKILLS TO BE LEARNED</b>		<b>I = Introduce D = Develop R = Reinforce M = Master</b>
• 9.1.12.a.3	Assess how a variety of problem-solving strategies are being used to address solutions to global problems by participating in online discussions with peers from other countries.	D,R,M

• 9.1.12.b.2	Create and respond to a feedback loop when problem solving.	D,R,M
• 9.4.12.k.6	<i>Locate, organize, and reference written information from various sources to communicate with others.</i>	D,R,M
• 9.4.12.k.24	<i>Employ technological tools to expedite workflow.</i>	D,R,M
• 9.4.12.k.44	Evaluate organizational policies and procedures that contribute to continuous improvement in performance and compliance.	D,R,M
• 9.4.12.k.59	<i>Identify and exhibit traits for retaining employment.</i>	D,R,M
• 9.4.12.k.81	Identify and describe quality assurance concepts to develop an understanding of the requirements for quality information technology products/services.	D,R,M
• 9.4.12.k.11	<i>Apply active listening skills to obtain and clarify information.</i>	D,R,M
• 9.4.12.k.12	<i>Develop and interpret tables, charts, and figures to support written and oral communications.</i>	D,R,M
• 9.4.12.k.13	<i>Listen to and speak with diverse individuals to enhance communication skills.</i>	D,R,M
• 9.4.12.k.14	Exhibit public relations skills in order to increase internal and external customer satisfaction.	D,R,M
• 9.1.12.e3	Differentiate between explicit and implicit digital media messages, and discuss the impact on individuals, groups, and society as a whole.	D,R,M
• 9.4.12.k.3	<i>Demonstrate science knowledge and skills required to pursue the full range of postsecondary education and career opportunities.</i>	D,R,M
• WHST.11-12.1.D.	Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing	R,M
• WHST.11-12.1.E,	Provide a concluding statement or section that follows from or supports the argument presented.	R,M
• WHST.11-12.2.A,	Introduce a topic and organize complex ideas, concepts, and information so that each	R,M

	new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.	
<ul style="list-style-type: none"> <li>• WHST.11-12.2.D,</li> </ul>	Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.	R,M
<ul style="list-style-type: none"> <li>• WHST.11-12.4,</li> </ul>	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	R,M
<ul style="list-style-type: none"> <li>• WHST.11-12.10</li> </ul>	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	R,M
<ul style="list-style-type: none"> <li>• RST.11-12.1.</li> </ul>	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.	R,M
<ul style="list-style-type: none"> <li>• RST.11-12.2,</li> </ul>	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.	R,M
<ul style="list-style-type: none"> <li>• RST.11-12.3,</li> </ul>	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.	R,M
<ul style="list-style-type: none"> <li>• RST.11-12.4,</li> </ul>	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11-12 texts and topics</i> .	R,M
<ul style="list-style-type: none"> <li>• RST.11-12.5,</li> </ul>	Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the	R,M

	information or ideas.	
• RST.11-12.6,	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	R.M
• RST.11-12.7.	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.	R.M
• RST.11-12.8,	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	R.M
• RST.11-12.9,	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	R.M
• RST.11-12.10	By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.	R.M

## **VI. Computer Repair IV Proficiencies Handout**

### **COURSE DESCRIPTION**

**Computer Repair IV is a full year study designed as a course to prepare the student for the Cisco Icnd 1 and Testout Cisco Pro Certification— measures your ability to perform real-world tasks based on the following topics:**

- **IP Routing Implementation**
- **OSPF Routing Configuration**
- **EIGRP Routing Configuration**
- **Access Control List Configuration**
- **Frame Relay Configuration**
- **NAT Configuration**
- **DHCP Server Configuration**
- **Router Security**
- **High Availability Configuration**
- **Switch Setup and Configuration**

- **Switch Interface Configuration**
- **TCP/IP Configuration**
- **VLAN Configuration**
- **InterVLAN Routing**
- **Spanning Tree Configuration**
- **Switch Security**
- **EtherChannel Configuration**

**Students of Computer Repair IV will study focuses on implementing, managing, protecting, and troubleshooting small to medium size enterprise branch networks**

## **PROFICIENCIES**

**Upon successful completion of this course, the student will be able to:**

- Use setup mode to complete an initial configuration of a Cisco device.
- Use the Express setup to configure a Cisco device
- Use help to identify possible commands, keywords, and parameters.
- Use advanced editing features to efficiently enter commands at the console.
- Turn on and access commands in the history buffer.
- Load an IOS image from an alternate location.
- Upgrade the IOS image.
- Use **show** commands to find information about the device configuration.
- Change the device host name.
- Configure descriptions on device interfaces.
- Configure router passwords including: enable, console, and VTY.
- Restrict console and VTY access to a Cisco device.
- Recover device passwords.
- Configure basic switch port parameters.
- View port statuses.
- Configure workstation TCP/IP settings.
- Configure an IP address and default gateway on a switch.
- Configure a router interface with an IP address.
- Use the SDM interface to configure the DHCP service on a router.
- Disable name resolution on a Cisco device.
- Create static DNS entries on a router.
- Configure static routes.
- Configure RIPv2 routing.
- Configure basic options and security on a wireless access point.
- Configure a wireless client connection.
- Given a subnet mask and an IP address, find the network address.

- Given a network address and a number of desired subnets and hosts, select the subnet mask.
- From a network address and subnet mask, identify valid subnet addresses.
- From a subnet address and mask, identify the range of valid host addresses.
- Given a scenario, select and configure subnet addresses, masks, and host addresses.
- Given a scenario, select the appropriate subnet addresses and masks to prepare for summarization.
- Given a scenario, identify the summarized route.
- Configure a serial interface for a basic WAN connection.
- Configure a serial connection between back-to-back routers.
- Configure PPP encapsulation on serial links.
- Configure PPP authentication including username and password combinations
- Create VLANs and assign switch ports to a VLAN
- Configure dynamic trunking modes.
- Configure the VTP mode on a switch.
- Set VTP domain and password parameters.
- Configure the spanning tree mode.
- Configure UplinkFast on access ports.
- Configure subinterfaces and ISL encapsulation to enable inter-VLAN routing on a router.
- Create an access list given customer requirements.
- Apply an existing access list to the appropriate router and interface.
- Enable IP routing.
- Configure RIP networks.
- Configure EIGRP routing.
- Use show commands to monitor EIGRP routing.
- Set frame relay encapsulation on a serial interface.
- Configure frame relay to use inverse ARP for address discovery.
- Create DHCP address pools.
- Configure NAT inside and outside interfaces.
- Configure static NAT and NAT pools.
- Configure switch port security.