

Cisco Discovery 2: Working at a Small-to-Medium Business or ISP (ITCC 1311)



Credit: 3 semester credit hours (2 hours lecture, 4 hours lab)

Prerequisite/Co-requisite: ITCC 1310

Course Description

This course prepares students for jobs as network technicians. It also helps students develop additional skills required for computer technicians and help desk technicians. It provides a basic overview of routing and remote access, addressing, and security. It also familiarizes students with servers that provide e-mail services, Web space, and authenticated access. Students also learn about soft skills required for help desk and customer service positions. Network monitoring and basic troubleshooting skills are taught on context.

Required Textbook and Materials

1. *Routing and Switching Essentials*, by Cisco Networking Academy, Cisco Press, 2013.
 - a. ISBN number for print book is 978-1-58713-318-3

Course Objectives

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

1. Describe the structure of the Internet and how Internet communications occur between hosts.
2. Install, configure, and troubleshoot Cisco IOS® devices for Internet and server connectivity.
3. Plan a basic wired infrastructure to support network traffic.
4. Implement basic WAN connectivity using Telco services.
5. Monitor network performance.
6. Isolate failures.
7. Demonstrate proper disaster recovery procedures.
8. Perform server backups.
9. Use the OSI and TCP/IP models and the process of encapsulation to troubleshoot problems using an organized, layered procedure.

Course Outline

1. Introduction to Switched Networks
 - a. Introduction
 - b. LAN Design
 - c. Switched Environment
2. Basic Switching Concepts and Configuration
 - a. Introduction
 - b. Basic Switch Configuration

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- c. Configure Switch Ports
- d. Switch Security: Management and Implementation
- 3. VLANs
 - a. Introduction
 - b. VLAN Segmentation
 - c. VLANs in a Multiswitched Environment
 - d. VLAN Implementation
 - e. VLAN Trunks
 - f. Dynamic Trunking Protocol
 - g. Troubleshooting VLANs and Trunks
 - h. VLAN Security and Design
 - i. Design Best Practices for VLANs
- 4. Routing Concepts
 - a. Introduction
 - b. Functions of a Router
 - c. Connect Devices
 - d. Basic Settings on a Router
 - e. Verify Connectivity of Directly Connected Networks
 - f. Switched Packets Between Networks
 - g. Path Determination
 - h. Analyze the Routing Table
 - i. Directly Connected Routes
 - j. Statically Learned Routes
 - k. Dynamic Routing Protocols
- 5. Inter-VLAN Routing
 - a. Introduction
 - b. Inter-VLAN Routing Configuration
 - c. Configure Legacy Inter-VLAN Routing
 - d. Configure Router-on-a-Stick Inter-VLAN Routing
 - e. Troubleshoot Inter-VLAN Routing
 - f. Layer 3 Switching
 - g. Troubleshoot Layer 3 Switching
- 6. Static Routing
 - a. Introduction
 - b. Static Routing
 - c. Types of Static Routes
 - d. Configure IPv4 Static Routes
 - e. Configure IPv4 Default Routes
 - f. Configure IPv6 Static Routes
 - g. Configure IPv6 Default Routes
 - h. Review of CIDR and VLSM

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- i. CIDR
 - j. VLSM
 - k. Configure IPv6 Summary Routes
 - l. Configure Floating Static Routes
 - m. Troubleshoot Static and Default Routes
7. Routing Dynamically
- a. Introduction
 - b. Dynamic Routing Protocol Operation
 - c. Dynamic Versus Static Routing
 - d. Routing Protocol Operating Fundamentals
 - e. Types of Routing Protocols
 - f. Distance Vector Routing Protocol Operation
 - g. Types of Distance Vector Routing Protocols
 - h. RIP and RIPng Routing
 - i. Configuring the RIPng Protocol
 - j. Link-State Dynamic Routing
 - k. Why Use Link-State Routing Protocols
 - l. Parts of an IPv4 Route Entry
 - m. Dynamically Learned IPv4 Routes
 - n. The IPv4 Route Lookup Process
 - o. Analyze an IPv6 Routing Table
8. Single-Area OSPF
- a. Introduction
 - b. Characteristics of OSPF
 - c. OSPF Messages
 - d. OSPF Operation
 - e. Configuring Single-Area OSPFv2
 - f. Configure Single-Area OSPFv2
 - g. OSPF Cost
 - h. Verify OSPF
 - i. OSPFv2 vs. OSPFv3
 - j. Configuring OSPFv3
 - k. Verify OSPFv3
9. Access Control Lists
- a. Introduction
 - b. IP ACL Operation
 - c. Standard Versus Extended IPv4 ACLs
 - d. Wildcard Masks in ACLs
 - e. Guidelines for ACL Placement
 - f. Standard IPv4 ACLs
 - g. Modify IPv4 ACLs

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- h. Securing VTY Ports with a Standard IPv4 ACL
- i. Structure of an Extended IPv4 ACL
- j. Troubleshoot ACLs
- k. Common ACL Errors
- l. IPv6 ACLs

10. DHCP

- a. Introduction
- b. Dynamic Host Configuration Protocol
- c. Configuring a Basic DHCPv4 Server
- d. Configure DHCPv4 Client
- e. Troubleshoot DHCPv4
- f. Dynamic Host Configuration Protocol v6
- g. Stateless DHCPv6
- h. Stateful DHCPv6 Server
- i. Troubleshoot DHCPv6

11. Network Address Translation for IPv4

- a. Introduction
- b. NAT Operation
- c. Types of NAT
- d. Benefits of NAT
- e. Configuring NAT
- f. Configuring Dynamic NAT
- g. Configuring Port Address Translation
- h. Port Forwarding
- i. Configuring NAT and IPv6
- j. Troubleshooting NAT

Grade Scale

| | |
|----------|---|
| 90 – 100 | A |
| 80 – 89 | B |
| 70 – 79 | C |
| 60 – 69 | D |
| 0 – 59 | F |

Course Evaluation

Final grades will be calculated according to the following criteria:

| | |
|--------------|-----|
| Labs | 30% |
| Study Guides | 10% |
| Module Tests | 30% |
| Final Exam | 30% |

Course Requirements

1. Demonstrate Proficiency through hands-on labs as assigned.
2. Build and Troubleshoot virtual Labs in Packet Tracer as assigned.
3. Complete Module Study Guides.

Course Policies

1. No food, drinks, or use of tobacco products in class.
2. Electronic devices not being used for the class, such as phones and headphones, must be turned off while in class.
3. Do not bring children to class.
4. Certification: If a student passes the certification test that is associated with this class, you will receive an “A” on the final exam and credit for 25% of your labs. If you have missed a previous test, you must still take the final exam to substitute for that grade.
5. Attendance Policy: Three absences are allowed. If a student is tardy to class or departs early three (3) times, it will be equal to one (1) absence. Each absence beyond three absences will result in a 2 point deduction from your final grade.
6. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an ‘F’ in the course.
7. Tools: Return all tools and/or software to their designated place.
8. A grade of ‘C’ or better must be earned in this course for credit toward degree requirement.
9. Additional course policies, as defined by the individual course instructor, will be outlined in the course addendum and provided by the instructor.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Technical Requirements (for courses using Blackboard)

The latest technical requirements, including hardware, compatible browsers, operating systems, software, Java, etc. can be found online at:

https://help.blackboard.com/en-us/Learn/9.1_2014_04/Student/015_Browser_Support/015_Browser_Support_Policy

A functional broadband internet connection, such as DSL, cable, or WiFi is necessary to maximize the use of the online technology and resources.

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the LIT Catalog and Student Handbook. The LIT Catalog and Student Handbook may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office. Please note that the online version of the LIT Catalog and Student Handbook supersedes all other versions of the same document.

Certification Requirement

CNTT majors are required to earn certification in one of the following areas prior to graduation.

- A+ Certification
- Cisco Certified Entry Network Technician (CCENT)
- Cisco Certified Network Associate (CCNA)
- Microsoft Certified Solutions Associate (MCSA)

This course covers part of the material to prepare for the Cisco Certified Entry Network Technician (CCENT) and the Cisco Certified Network Associate (CCNA) Routing and Switching certifications. All material for the CCENT will be covered in the first two Cisco sources. All four Cisco courses must be completed to cover the material for the CCNA exam. The CCNA credential can be earned by taking two tests, Interconnecting Cisco Networking Devices Part 1 (ICND1) and Interconnecting Cisco Networking Devices Part 2 (ICND2), or by taking one test, Interconnecting Cisco Networking Devices: Accelerated (CCNAX). ICND1 is test number 100-101, ICND2 is test number 200-101, and the CCNAX test number is 200-120. Students are responsible for scheduling and paying for the certification through the LIT Testing Center. More information about the certification can be found online at <http://www.cisco.com/c/en/us/training-events/training-certifications/certifications.html>.

Course Schedule

| Week of | Topic | Reference |
|---------|---|---|
| Week 1 | Syllabus and policies | |
| | Course Introduction | https://cisco.netacad.net |
| | Chapter 1: Introduction to Switched Networks | pp. 1-32 |
| Week 2 | Chapter 2: Basic Switching Concepts and Configuration | pp. 33-88 |

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| Week of | Topic | Reference |
|---------|--|---|
| Week 3 | Chapter 3: VLANs | pp. 89-148 |
| Week 4 | Chapter 4: Routing Concepts | pp. 149-230 |
| Week 5 | Chapter 4: Routing Concepts | pp. 149-230 |
| Week 6 | Chapter 5: Inter-VLAN Routing | pp. 231-282 |
| Week 7 | Chapter 6: Static Routing | pp. 283-378 |
| Week 8 | Chapter 6: Static Routing | pp. 283-378 |
| Week 9 | Chapter 7: Routing Dynamically | pp. 379-474 |
| Week 10 | Chapter 7: Routing Dynamically | pp. 379-474 |
| Week 11 | Chapter 8: Single-Area OSPF | pp. 475-548 |
| Week 12 | Chapter 8: Single-Area OSPF Chapter 9: Access Control Lists | pp. 475-548 pp. 549-638 |
| Week 13 | Chapter 9: Access Control Lists | pp. 549-638 |
| Week 14 | Chapter 10: DHCP | pp. 639-694 |
| Week 15 | Chapter 11: Network Address Translation for IPv6 | pp. 695-754 |
| Week 16 | Final Exam | https://cisco.netacad.net |

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