CIT 281
Routing and Switching

Course Description

This course provides students with the skills necessary to understand and apply concepts related to networking hardware. This course covers advanced TCP/IP concepts such as IP addressing and subnetting, beginning router configuration, routed and routing protocols. This is the second course in the Cisco Networking Academy Curriculum. Prerequisites: CIT 160; or consent of instructor.

Course Competencies

Upon successful completion of this course, the student can:
1. Demonstrate an understanding of internetworking routers and their use in networks.
2. Demonstrate an understanding of wide area networks (WANs).
3. Demonstrate an understanding of router's command line interface.
4. Be able to log into the router.
5. Demonstrate how to enter router modes.
6. Demonstrate an understanding of router components.
7. Use router configuration commands.
8. Demonstrate use of basic network testing commands.
9. Demonstrate remote router access using Telnet.
10. Demonstrate network troubleshooting.
11. Demonstrate a network configuration.
12. Demonstrate an understanding of IOS Versions.
13. Be able to discuss the TCP/IP Protocol Suite.
14. Demonstrate an understanding of IP addressing and subnetting.
15. Demonstrate an understanding of the role of DNS in router configurations.
16. Demonstrate the ability to set up static routes.
17. Demonstrate the ability to run RIP on a network.

Course Outline

I. Routers
   A. Basic information about routers and their use in networks
   B. Wide Area Networks (WANs)
II. Using Routers
   A. Basics of router's command line interface
   B. How to log into the router
   C. How to enter router modes
   D. Different router modes and commands
III. Router Component
   A. Router components
   B. Router show commands
   C. Router's network neighbors
D. Basic network testing commands
E. CDP-related commands
F. Remote router access using Telnet
G. Network connectivity using Ping
H. Network troubleshooting using Trace IP
I. Interface status using Show Interface

IV. Router Startup & Setup
A. Router boot sequence and setup mode
B. Configure a router from setup mode

V. Router Configuration
A. Location of router configuration files
B. Basic router configuration
C. Router interface configuration
D. Network configuration

VI. IOS
A. Basics of IOS versions
B. Use and interpretation of the show version command
C. Load IOS images
D. Loading IOS images from a TFTP server
E. Loading a new IOS image

VII. TCP/IP
A. Basics of layer 4
B. Important layer 3 concepts
C. TCP/IP protocol suite
D. The show ARP command
E. Gather and use ARP table information
F. Router troubleshooting

VIII. IP Addressing
A. IP addressing and subnetting
B. Role of DNS in router configurations
C. Assigning new subnet numbers to the semester 2 topology
D. Assigning subnet numbers to a real network

IX. Routing
A. Basics of routing
B. Why routing protocols are necessary
C. Basics of distance-vector routing
D. Basics of link-state routing
E. Context of different routing protocols

X. Routing Protocols
A. Static routing and default routes
B. Interior and exterior routing protocols
C. RIP
D. IGRP
E. Routes
F. Routing loops
G. Routing loops prevention