

## **NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY**

### **ITN 154 – INTRODUCTION TO NETWORKS - CISCO (4 CR.)**

#### **Course Description**

Provides instruction in the fundamentals of networking environments, the basics of router operations, and basic router configuration. Lecture 3 hours. Laboratory 2 hours. Total 5 hours per week.

#### **General Course Purpose**

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to build a foundation for the curriculum. The purpose of this course is to provide students with knowledge and skills to build simple LANs, perform basic router and switch configurations, and implement IP addressing schemes. Knowledge and skills acquired from this course will lay the groundwork for industry related certifications: CCNA, CCENT, and Network+.

#### **Course Prerequisites/Corequisites**

College level reading and writing ability

#### **Course Objectives**

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

- a) Understand and describe the devices and services used to support communications in data networks and the Internet
- b) Understand and describe the role of protocol layers in data networks
- c) Understand and describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments
- d) Design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks
- e) Explain fundamental Ethernet concepts such as media, services, and operations
- f) Build a simple Ethernet network using routers and switches
- g) Use Cisco command-line-interface (CLI) commands to perform basic router and switch configurations
- h) Utilize common network utilities to verify small network operations and analyze data traffic

#### **Major Topics to be Included**

- a) Interoperability in network communications
- b) OSI Model and the TCP/IP suite
- c) IP addressing scheme
- d) IOS device settings
- e) Router and switch configuration
- f) Securing the network

#### **Student Learning Outcomes**

1. Interoperability in Network Communications
  - 1.1. Describe the topologies and devices in a small to medium-sized business network.
  - 1.2. Explain the roles of protocols and standards in network communications.

- 1.3. Explain the basic characteristics of a network that supports network communication including
  - 1.3.1. LANs and WANs
  - 1.3.2. Intranet and Extranet
  - 1.3.3. Wireless Network
  - 1.3.4. Network Trends
2. The OSI Model and the TCP/IP Suite
  - 2.1. Explain the benefits of using a Layered Model.
  - 2.2. Compare the OSI Model and the TCP/IP Model.
  - 2.3. Explain how the different layers of the TCP/IP model support communication across data networks.
    - 2.3.1. Application Layer
    - 2.3.2. Transport Layer
    - 2.3.3. Network Layer
    - 2.3.4. Data Link Layer
    - 2.3.5. Physical Layer
  - 2.4. Explain how the protocols and services in each layer support communication across data networks.
3. IP Addressing Scheme
  - 3.1. Connect network devices with appropriate media based on network requirements.
  - 3.2. Design an addressing scheme to provide network connectivity.
  - 3.3. Use common testing utility tools to verify and test network connectivity
  - 3.4. Differentiate IPv4 and IPv6 and explain how they support network connectivity.
  - 3.5. Calculate the network and host IPv4 addresses to enable end-to-end connectivity.
    - 3.5.1. Perform IPv4 and IPv6 subnet allocation.
4. IOS Device Settings
  - 4.1. Explain the features and function of Cisco IOS
  - 4.2. Identify the Cisco IOS modes of operation.
  - 4.3. Configure initial settings on a network device using Cisco IOS
  - 4.4. Understand and explain the command structure of the Cisco IOS.
5. Router and Switch Configuration
  - 5.1. Explain the functions of routers and switches in a small to medium-sized business network.
  - 5.2. Perform basic router configurations.
    - 5.2.1. Saving and accessing router configurations
  - 5.3. Implement basic LAN switching.
  - 5.4. Use show commands and utilities to establish performance baseline.
  - 5.5. Use utilities PING, PATHPING, TRACEROUTE to troubleshoot.
6. Securing the Network
  - 6.1. Explain the categories of threats to network security.
  - 6.2. Recognize and describe the types of security vulnerabilities.
  - 6.3. Describe measures to mitigate network attacks.
  - 6.4. Explain steps to secure devices including end and intermediate devices.

### **Required Time Allocation per Topic**

In order to standardize the core topics of ITN 154 so that a course taught at one campus is equivalent to the same course taught at another campus, the following student contact hours per topic are required. Each syllabus should be created to adhere as closely as possible to these allocations. Of course, the topics cannot be followed sequentially. Many topics are taught best as an integrated

whole, often revisiting the topic several times, each time at a higher level. There are normally 60 student-contact-hours per semester for a four credit course. (This includes 15 weeks of instruction and does not include the final exam week so  $15 * 4 = 60$  hours. Sections of the course that are given in alternative formats from the standard 16 week section still meet for the same number of contact hours.) The final exam time is not included in the time table. The category, Other Optional Content, leaves ample time for an instructor to tailor the course to special needs or resources.

| <b>Topic:</b>                              | <b><u>Time in Hours:</u></b> | <b><u>Percentages:</u></b> |
|--|------------------------------|----------------------------|
| Interoperability in Network Communications | 6                            | 10%                        |
| OSI Model and TCP/IP Suite                 | 10                           | 17                         |
| IP Addressing                              | 8                            | 12                         |
| IOS device settings                        | 10                           | 17                         |
| Router and switch configurations           | 12                           | 20                         |
| Securing the network                       | 4                            | 7                          |
| Other optional content                     | 4                            | 7                          |
| Exams and quizzes                          | 6                            | 10                         |
| <b>Total:</b>                              | 60                           | 100%                       |