NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
ITN 245 – NETWORK TROUBLESHOOTING (3 CR.)

Course Description

Focuses on servicing and maintaining local area networks (LANs). Teaches network installation, network troubleshooting, installation of file servers and workstations, configuring of network boards and cables, and diagnosing common network problems. Lecture 3 hours per week.

General Course Purpose

This course provides a comprehensive foundation in understanding of today widely used of network infrastructure protocols. Students will learn how apply these protocols using most current network operating systems. These skills are typically expected from a network administrator, but also from network engineer and network support technician. The covered material of this course will be related to the industry certification of covered operating system.

Course Prerequisites/Corequisites

Prerequisite: ITN 100 or ITN 101. Students must be able to read and write at a college level.

Course Objectives

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

- Describe and explain the function of variety of network infrastructure protocols.
- Implement, configure, maintain and troubleshoot currently used network infrastructure protocols in today widely used network operating system.

Major Topics to be Included

1. Name resolution infrastructure
2. TCP/IP implementation
3. Security implementation
4. PKI implementation
5. Internet connectivity (NAT, Firewall, and Proxy Services)

Student Learning Outcomes

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

1. **Design and implement a name resolution infrastructure**:
   1.1. DNS zones, domains, delegation and zone transfers
   1.2. proper resource records for a zone
   1.3. DNS security
   1.4. Integrate a local DNS with DNS Servers on the Internet
   1.5. WINS and NetBIOS name resolution to support DNS
   1.6. HOSTS and LMHOSTS files as necessary
   1.7. Limitations of NetBIOS Naming
   1.8. Integrate DNS and DHCP services

2. **Design and implement TCP/IP protocol on an internetwork**
   2.1. Design and implement proper TCP/IP on Servers and workstations

2.2. Understand all TCP/IP settings on a workstation

2.3. Implement TCP/IP using DHCP

3. **Design and implement an security infrastructure**
    3.1. security based on a given set of criteria
    3.2. IPSec (IP Security)
    3.3. Windows Security Templates
    3.4. SMB (Server Message Block) security
    3.5. remote access (RAS) security
    3.6. web security (SSL)

4. **Design and implement a PKI (Public Key Infrastructure)**
    4.1. Understand and implement a PKI
    4.2. Understand certificates
    4.3. Understand Public/Private key concepts

5. **Design and implement an Internet connectivity strategy**
    5.1. NAT (Network Address Translation), Firewall, and Proxy Services implementation
    5.2. Define and implement NAT using Windows 2003
    5.3. Define a Firewall and implement a simple firewall strategy
    5.4. Understand Proxy services and differences between it and NAT
    5.5. Implement a simple Proxy Server

Required Time Allocation per Topic

In order to standardize the core topics of ITN 245 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 45 student-contact-hours per semester for a three credit course. (This includes 15 weeks of instruction and does not include the final exam week so 15* 3 = 45 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.

Topic	Time in Hours	Percentages
Design and implement a name resolution infrastructure	9	20%
Design and implement TCP/IP protocol on an internetwork	7	16%
Design and implement an security infrastructure	8	18%
Design and implement a PKI (Public Key Infrastructure)	6	13%
Design and implement an Internet connectivity strategy	9	20%
Other Optional Content	2	4%
Testing to include quizzes, tests, and exams (not including final exam)	4	9%
Total	45	100%