

Date: October 2005

- I. Course Name:** Data Communications and Networking
Prefix and Number: CSC 260
Credit Hours and Contact Hours: 3 credit hours - 3 contact hours
Course Description:

The increasing computerization of today's workplace has created the need for knowledgeable technicians, managers and administrators well grounded in the techniques of connecting multiple computer platforms, enabling data communications in diverse hardware and software environments and providing reliable communication between all parts of the organization. This course provides an overview of the essential fundamentals of networking and system administration required in today's local area network (LAN) environment as well as a solid foundation for the student's pursuit of certification through other programs such as CompTIA's Net+ and Microsoft's Certified Professional program. Specifically, the course will focus on the data communication technology, including telecommunication basics, LAN fundamentals and wide area network (WAN) principals that comprise today's complex networking environment. Students will be required to complete several hands-on labs covering a number of activities for the creation and maintenance of Server-based, networked environment (i.e., Windows Server and Windows Workstation products). The course will also include the study of a working medium-sized institutional network. Prerequisite: CSC115 with a C or better or permission of instructor.

II. Course Outcomes and Objectives

Learning Outcomes

Upon completion of the course the participant will be able to:

1. Explain basic networking terminology and concepts including:
 - a) evolution of networks
 - b) basic telecommunication networks
 - c) network topologies, media and components
 - d) networking standards and models
 - e) network transport systems and protocols
 - f) fault tolerance techniques
2. Use some network administration tools to:
 - a) plan a network
 - b) provide overall management of day-to-day networking activities
 - c) troubleshoot network problems
3. Explain the components of good network security.
4. Explore and effectively use workstation utilities.
5. Explore and effectively use server utilities.

6. Explore and effectively use system administration tools
7. Set-up shared resources on the network
8. Understand WAN basics, and how the Internet can be used to expand the connectivity between all segments of the organization.
9. Explore the technology to integrate the Internet into the organizations networking environment as a vehicle to expand the ability to communicate with others outside the organization and share resources with all parts of the organization regardless of location.
10. Discuss the future of the Internet and its impact on society and the individual

Relationship to Academic Programs and Curriculum

This course is a required course for AAS IT majors, in the Web Programming advisement area. It can also be taken for elective credit by the AS IS and CS majors.

Competencies Addressed in this Course:

- Information resources
- Reading
- Computer Literacy
- Problem Solving and Critical Thinking
- Ethics and Values
- Professional Competency

III. Methods of Instruction

Types of Course Materials

-Textbooks: a conceptual, practice and case study book on Networking Essentials

Methods of Instruction

1. Lecture
2. Discussions
3. Demonstrations
4. Hands-on lab activities
5. Programming

Assessment Measures

Activities will emphasize problem solving using the computer as part of both a local area network, and a wide area network. The students should demonstrate proficiency using a LAN operating system at the command level. (i.e., Netware, Windows NT Server). They should also demonstrate an ability to use a WAN (i.e., the Internet).

Methods of Evaluation

The demonstration of the satisfactory achievement of the above learning outcomes will be the responsibility of the student, facilitated by the instructor. The department maintains a very open attitude and believes each instructor should determine the grading system and evaluation methods that will be used in his/her sections of the course. It is highly recommended that these be communicated to the students the first week of the semester, preferably in writing.

IV. General Outline of Topics Covered

1. Introduction to Networks
 - 1.1. Basic Network Concepts
 - 1.2. Network Capabilities and Services
 - 1.3. Client/Server Networking
 - 1.4. Network Operating Systems
 - 1.5. LANs, MANS, WANs and Enterprise Networks
2. Networking Standards and Models
 - 2.1. Key Networking Standards Organizations
 - 2.2. The Open Systems Interconnection (OSI) Model
 - 2.3. Communication between Stacks
 - 2.4. Applying the OSI Model
3. Topologies and Communication Media
 - 3.1. Network Topologies
 - 3.2. Communication Media
 - 3.3. Media Costs and Considerations
4. Network Transport Systems and Protocols for LANS
 - 4.1. Ethernet and the IEEE 802.3 Standards
 - 4.2. Token Ring and the IEEE 802.5 Standards
 - 4.3. Microsoft Networking Services
 - 4.4. IPX and NWLink
 - 4.5. TCP/IP
 - 4.6. Connecting to Mainframes and other Platforms
5. High Speed Network Transport
 - 5.1. WAN and Enterprise Network Communication
 - 5.2. High Speed Transport i.e. FDDI, X.25, ISDN, ATM, SONET
6. Devices for Network and Internetwork Connectivity includes: Multiplexors, Repeaters, Bridges, Routers, Brouters, Hubs, Gateways, Virtual LANs (VLANs)
7. Planning a Network
 - 7.1. Developing Network Plans
 - 7.2. Estimating Network Costs

- 7.3. Managing Network Performance
- 7.4. Planning Network Security

- 8. Fault Tolerance Techniques
 - 8.1. Equipment Failure
 - 8.2. What Fault Tolerance Means
 - 8.3. Developing a Backup Plan
 - 8.4. Developing a Disaster Recovery Plan

- 9. Remote Network Access
 - 9.1. Remote Access Overview
 - 9.2. Modems
 - 9.3. Remote Access Protocols
 - 9.4. Remote Access Services
 - 9.5. Security

- 10. Network Monitoring
 - 10.1. Network Monitoring Overview
 - 10.2. Establishing Network Traffic Characteristics
 - 10.3. Simple Network Management Protocol (SNMP)
 - 10.4. Network Monitoring Devices and Tools
 - 10.5. Remote Network Monitoring

- 11. System Administration (Managing the Network)
 - 11.1. Enterprise Network Management Tools Overview
 - 11.2. Event Management
 - 11.3. Services Management
 - 11.4. Firewalls

- 12. Troubleshooting Network Problems
 - 12.1. Developing a Problem Solving Strategy
 - 12.2. Tuning Servers and Workstations
 - 12.3. Troubleshooting Specific Network Problems i.e. Server Disk Capacity, Cable Problems, Printing Problems
 - 12.4. Detecting and Resolving Network Performance Problems

Among the evaluation methods that could be used are exams, quizzes, and programming assignment projects. Any grading system used must be consistent with the College Catalog and Middle States grading procedure. Course policies about attendance, late work, plagiarism, etc.. are at the discretion of the instructor. If such policies exist, they must be communicated to the student, preferably in writing.