

Internet Technology (MSIE604)

3 credits

1. Description

This course provides an overview of networking technologies and protocols in the current Internet. It focuses on TCP/IP and application-layer protocols, as well as several client-server applications. In addition, various security and network management issues are explored. Course work consists of written exercises and practical explorations.

2. Intended Audience

Students enrolled in the MSIE program.

3. Goals

To develop an understanding of the technologies that serve as the foundation of the Internet, as well as several client-server applications, security and cryptography.

4. Learning Objectives

By the end of the course, the student will have an understanding of:

- Networking fundamentals and the OSI model
- IP protocol, addressing, routing, and subnetting
- TCP and UDP protocols
- Several application-layer protocols
- Several client-server applications
- Basic cryptography
- Security issues relating to TCP/IP
- Network monitoring protocols

5. Topical Outline

- Networking Fundamentals
- TCP/IP Protocol Stack
- Application-Layer Protocols
- Client/Server Applications
- Cryptography and Security

6. Instructional Procedures

Classes are three hours, and are held every two weeks. Tentatively, classes will be held on Saturday mornings from 8:30am – 11:30am. “Exploration” assignments and/or written exercises are posted on the course wiki prior to each class meeting and are due by the next class meeting. Assignments are to be submitted by e-mail, posted on a web page (with a link sent to the instructor), or other equivalent method. In between class meetings, communication will be primarily through the course wiki or e-mail.

7. Evaluation Procedures

Grades are based upon completion of assignments, exercises and class participation. The “explorations” have no right or wrong answers – they may involve exploring a topic using tools demonstrated in class, or installing an application. The basic philosophy is that you “get out what you put in.”

8. Format

Class Session	Topics	Text Chapters
Sept. 9	Overview: Numbering Systems, OSI Model, Tools, Layers 1 and 2	1, 4-8, 88
Sept. 23	Layer 3: IP Addressing, Subnetting, Routing, ICMP, DHCP, NAT	13-24, 28, 31-32, 61
Oct. 7	Layer 4: TCP, UDP, Flow Control, Congestion, TCP Security	42-49
Oct. 21	Application Layer: DNS, HTTP, SMTP, POP3, IMAP	50-57, 70, 74-84
Nov. 4	Client/Server Applications: Apache, CGI, PHP, MySQL, BIND	Online
Nov. 18	Security: Cryptography, SSH, Firewalls, VPNs	Online
Dec. 9	Security, Part II: Vulnerabilities, Intrusion Detection/Prevention, Monitoring	Online, 65-68

9. Prerequisites

None

10. Instructional Resources

Course Text: *The TCP/IP Guide: A Comprehensive, Illustrated Internet Protocols Reference* by Charles M. Kozierok, ISBN: 1-59327-047-X

Other optional books and online materials will be provided on the course wiki.