HOSTOS COMMUNITY COLLEGE
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

Computer Networking

Course Number: **CSC 375**
Course Title: **Computer Networking**
Credit Hours: **3.0**
Equated Hours: **3.0**
Class Hours: **3.0**

Pre Requisite: CSC 215 Modern Programming
Pre/Co-requisite: ENG 93/ESL 91/ ESL 93 or equivalent

Course Description: This course studies the design principles of network infrastructure and how these designs may be compromised and how they work. Thus, it presents principles and methodologies used in the design and implementation of modern computer networks and networked information systems. Topics include: shared use of a multiple access channel, error detection and recovery, and flow and congestion control. This course studies packet switched networks, routing protocols, internet protocols and protocols at each layer. This course also introduces network programming-algorithms and procedures for secure and reliable transport over best-effort deliver systems. Students will develop several client-server applications such as writing a simple networking service at the I.P. layer or higher

Recommend Text: Computer Networking- A Top –Down Approach Featuring the Internet, by James F. Kurose & Keith W. Rose, Addison Wesley, Latest Edition.

Grade is based upon Programming Projects and Final Exam:
Students will complete 3-4 simulation projects in a computer laboratory 30%
Midterm 30%
Final 40%

Student Learning Objectives

1) Student will demonstrate ability for designing fundamentals of network systems
2) Student will demonstrate ability to apply principles of application layer protocols
3) Students will demonstrate ability to apply principles of applications with transport layer
4) Student will demonstrate ability to apply routing principles and algorithms involved with the Network layer
5) Student will demonstrate a fundamentals knowledge involved in probability and operational analysis of networks
6) Students will demonstrate ability to work with network simulation tools

Course Outline

Part 1: Introduction
- The Internet and its layered architecture
- Delay and Loss in Packet-Switched Networks
- Internet Backbones, NAPs and ISPs

Part 2: The Application Layer
- Principles of Application-Layer Protocols
- Important application-layer protocols: HTTP, FTP, Electronic-Mails, DNS, etc.
- Socket Programming

Part 3: The Transport Layer
- Transport-Layer Services and Principles
- Multiplexing and Demultiplexing Applications
- Principle of Reliable Data Transfer
- Principle of Congestion Control
- UDP, TCP

Part 4: The Network Layer
- Routing Principles and Algorithms
- IP: the Internet Protocol

Part 5: The Link Layer and Local Area Networks
- Introduction on the Data Link Layer and its services
- Error Detection and Correction
- Multiple Access Protocols
- LAN and ARP
- PPP: Point-to-Point Protocol
- ATM

Part 6: Wireless Networks
- IEEE 802.11
- Handling Mobility
- Ad-hoc wireless networks
- Cellular networks

Part 7: Security in Computer Networks
- Principles of Cryptography
- Authentication and Authorization
- Key Management Protocols
- Firewalls
- Attacks and countermeasures