DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

KATHMANDU UNIVERSITY

COMP 204: DATA COMMUNICATION AND NETWORKING

COURSE DESCRIPTION

This course intends to deliver the broad concept of data communication principles. It also focuses on the underlying principle of computer networks. This course builds idea on the protocol layer structure that is set as standard network architecture. This course is designed in a bottom up approach that means we try to learn how bits are moving in physical layer before learning how some programs exchanges message at the application layer. We conclude the course by exploring some of the security features implemented on preserving data confidentiality and security of the network.

GRADING POLICY :

Final Exam:	50 %
Internals:	50 %

CONTENTS

- o Flow and error control
- o Protocols
  - For noiseless channel
    - Simplest
    - Stop and wait
  - For noisy channel
    - Stop and Wait ARQ
    - Go-Back-N ARQ
    - Selective Repeat ARQ
- Media Access Control
  - o Random Access
    - ALOHA
      - Pure ALOHA
      - Slotted ALOHA
    - CSMA
    - CSMA/CD
    - CSMA/CA
  - o Controlled Access
    - Reservation
    - Polling
    - Token Passing
  - o Channelization
    - FDMA
    - TDMA
    - CDMA
- Some Self Study Topics

Chapter Four: Network Layer(9 Hours)

- Introduction to Network Layer
- Packet Switching
  - o Datagram Approach
  - o Virtual circuit approach
- Routing
  - o Optimality Principle
  - o Shortest Path
  - o Link State
  - o Distance Vector
  - o Hierarchical
  - o Broadcast
  - o Multicast

- o   Routing for mobile hosts
- Congestion control
  - o   Data gram subnet : Choke packet
  - o   Virtual circuit subnet
- Quality of Service

Chapter Five: Transport Layer   (3 Hours)

- Introduction
- User Datagram Protocol
- Transmission Control Protocol
  - o   Three way handshake protocol

Chapter Six: Application Layer   (3 Hours)

- Introduction
- World wide web and HTTP
- Electronic mail
- TELNET
- Secure Shell (SSH)
- Domain Name System

Chapter Seven: Cryptography and Network Security (6 Hours)

- Introduction
- Security goals
- Attacks
- Symmetric Key Ciphers
- Asymmetric Key Ciphers
- Other aspects of security
  - o   Message integrity
  - o   Message authentication
  - o   Digital signature
  - o   Entity authentication
  - o   Key management
- Discussion on some current key issues on security

TEXT BOOKS

1. Behrouz A. Forouzan, "**Data Communications and Networking**", Fifth Edition
2. Andrew S. Tanenbaum "**Computer Networks**", Fourth Edition