Course Code Course Title
COMP 4621 Computer Communication Networks I

Course Description

Principles of computer network architectures and communication protocols; the OSI reference model; switching and multiplexing techniques; data link, network, transport and application layers; LAN and medium access protocols; network programming. Prerequisite(s): COMP 3511; Exclusion(s): COMP 5621, ELEC 3120, ISOM 3180; Background: Probability and statistics

List of Topics

- Introduction
  - Internet architecture, network edge and core, performance
  - Protocols
  - Circuit Switching
  - Packet Switching
  - Delay in the Internet
  - Layered architecture
- Application Layer
  - Application layer protocols
  - Client-Server vs Peer to Peer
  - Examples of Client-server Application layer protocols: HTTP, DNS
  - Peer-to-Peer or P2P Application Example
  - Socket programming
- Transport Layer
  - Transport layer services
  - Multiplexing and Demultiplexing
  - UDP
  - Reliable data transfer (RDT) principles: Stop-and-Wait
  - Window based pipelined RDT
  - Go-Back-N (GBN) Protocol
  - Selective Repeat (SR) Protocol
  - TCP Basics, Round-Trip Time Estimation and Timeout
  - TCP Reliable data Transfer
  - Fast Retransmit, TCP Flow Control & TCP Connection Management
  - The basic principles of congestion control
  - TCP congestion control
- Network Layer: The Data Plane
  - Forwarding and routing
  - Fragmentation and Reassembly
  - IP addressing
- Network Layer: The Control Plane
  - Control Plan of Network layer Protocols
  - Distance Vector Routing and RIP

- Link State Routing and OSPF
- Border Gateway Protocol (BGP)

❖ Link Layer
- Link Layer Services
- MAC layer addressing
- Multiple access protocols
- Random Access
- Switch vs. Router
- Ethernet and link-layer switches

Textbook

Computer Networking: A Top-Down Approach
James Kurose and Keith Ross, Pearson (7th Ed.)

Reference books

N/A

Grading Scheme

Midterm Exam	25%
Final Exam	40%
4 Homework	20% (5% each)
Project	15%
Total	100%

Course Intended Learning Outcomes

- Define the basic principles of computer networks, architecture and protocols.
- Identify the principles of networked applications, including C/S based applications (such as HTTP, FTP, SMTP and DNS) and P2P based applications (such as BT)

- Discuss the major transport layer protocols, such as TCP and UDP.
- Illustrate the principles of routing algorithms and their applications on the Internet.
- Identify basic link layer protocols and the basic medium access mechanism.

Assessment Rubric

N/A