Instructor: Dr. Thinh Nguyen  
Credits: 4  
Meeting Time: TR: 8-9:50 AM  
Location: Owen 103  
Office Hour: TR: 1-2 PM  
Website: [http://web.engr.oregonstate.edu/~thinhq/teaching/ece465/fall05/fall05.html](http://web.engr.oregonstate.edu/~thinhq/teaching/ece465/fall05/fall05.html)

Course Description:

This course covers the basic concepts of networking layers and their functionalities. These include network architectures, routing algorithms, and link and transport protocols.

Prerequisites:

By course: ECE 375, CS 261, or instruction’s permission.  
By topic: Basic knowledge of computer organization, programming skills.

Course Learning Objectives:

Both graduate/undergraduate students must demonstrate the ability to:

1. Analyze the optimum segment size which leads to minimum delay in sending a large data file.  
   (ABET Outcomes: a, c, k)  
2. Analyze the latency of sending an object as a function of RTT window size (static and dynamic).  
   (ABET Outcomes: a, c, k)  
3. Analyze the distance vector algorithm. (ABET Outcomes: b, c, j, k)  
4. Analyze the link-state algorithm. (ABET Outcomes: a, j)  
5. Analyze the Carrier Sense Multiple Access with Collision Detection (CSMA/CD).  
   (ABET Outcomes: b, c, j, k)  
6. Design a triple duplicate ACKs. (ABET Outcomes: b, c, j, k).

Graduate student must demonstrate the ability to:

1. Design and implement a sophisticated, reliable transport protocol. (ABET Outcomes: b, c, j, k).

Topics:

- Introduction to computer networks and the Internet  
- Basic probability theory  
- Application layer  
  - http
• FTP
• SMTP
• DNS
• P2P
  o Socket programming

• Transport Layer
  o Principles of reliable transport
  o UDP
  o TCP
  o Congestion control

• Network Layer and Routing
  o Routing principles
  o IP
  o Routing in the Internet

• Link Layer and Local Area Networks
  o Error detection and correction
  o Multiple access protocols and LANs
  o LAN address and ARP
  o Ethernet
  o IEEE 802.11 LANs (Wireless)

• Physical Layer
  o Router design overview
  o Optical communication overview

Grading:

Assignments (written and programming assignments) 40%
Midterm 1 15%
Midterm 2 15%
Final 30%