CS4121   Data Communications & Computer Networks I

Semester   Fall 2008
Class   TBD
Prerequisite   CS3101 and CS3410
Course Description

Serving as the 1ˢᵗ one in a series of networking courses, this course aims at building a firm foundation of data communications and computer networks for students. A thorough understanding of concepts and mechanisms underlying general telecommunications and networking is believed to be essential for students to be able to learn and grasp knowledge about other advanced and specific technologies and architectures. Students are exposed to the *big picture* of networks we draw in this course that allows them to see how the various parts/layers of the network work individually, and fit into one whole. This course covers basic networking concepts and models, physical data communication mechanisms, Local Area Networks, packet switching networks, end-to-end data transmission control, and important applications.

Learning Outcomes

On successful completion of this course, the student should be able to

1. Describe the fundamental principles in data communications and computer networks including
   - Delay and loss in Packet-Switched Networks
   - Protocol layers and their service models
   - Popular network applications like HTTP, FTP, SMTP, DNS, P2P, etc
   - Reliable data transfer and sliding window protocols
   - Congestion control and flow control
   - Routing algorithms like LS an DV
   - LAN and Ethernet with emphasis on error detection and multiple access protocols
2. Mathematically and logically analyze how computer protocols work in the abstract
3. Solve real-world problems in the context of today's Internet (TCP/IP and UDP/IP)

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WebCT. **So do NOT write to my Valdosta address directly.**)

Textbook(s)   *Computer Networking, A Top-Down Approacht, 4th edition*
By James F. Kurose, and Keith W. Ross
Publisher: Addison-Wesley
ISBN: 0-321-49770-8

Course Coverage

Chapter 1   Computer Networks and the Internet
- The Network Edge
- The Network Core
- Delay, Loss, and Throughput in Packet-Switched Networks
- Protocol Layers and Their Service Models
- …

Chapter 2   Application Layer
- Principles of Application Layer Protocols
- The Web and HTTP
- File Transfer: FTP
- Electronic Mail in the Internet
- DNS – the Internet's Directory Service
- Peer-to-Peer Applications
- …

Chapter 3   Transport Layer
- Multiplexing and Demultiplexing
- Principles of Reliable Data Transfer
- Connection-Oriented Transport: TCP
- Principles of Congestion Control
- …

Chapter 4   Network Layer and Routing
- Virtual Circuit and Datagram Networks

- What's Inside a Router
- The Internet Protocol (IP): Forwarding and Addressing in the Internet
- Routing Algorithms
- Routing in the Internet
- …

Chapter 5   Link Layer and Local Area Networks
- Error-Detection and –Correction Techniques
- Multiple Access Protocols
- Ethernet
- Link-Layer Switches
- …

Grading Policy   Your grade will be calculated based on *unevenly weighted* 8+ assignments and 2 tests. The material in the book can be categorized into the following three portions: those subjects that I elaborate and discuss in class; those subjects that you are asked to go over yourselves after class; and those that I would skip explicitly due to time constraints. Questions in the assignments and tests come from the first two only.

Grading scale:

Final Grade	Credit
A	90-100 (including 90)
B	80-89 (including 80)
C	70-79 (including 70)
D	60-69 (including 60)
F	0-59

Course Policy   For the sake of the efficiency of the class, please observe the
following rules:

- Late assignment will NOT be accepted. You must turn in assignments at the beginning of the class on the due date.
- For each assignment, problems and/or disagreement concerning the grade, if any, must be resolved within TWO weeks after the assignment is turned back to the students. No change will be made to the grade any more afterwards, for whatever reason.
- NO make up assignments/tests for this course.

Attendance and Absence

- You are expected for every scheduled class meeting (be on time and stay for the full class period).

ADA

Students requiring classroom accommodations or modifications because of a documented disability
should discuss this need with me at the beginning of the semester. For additional information, please
contact the Special Service Program in Room 1115 Nevins Hall. The Special Services office may be
reached by telephone at 229-245-2498.

Important Dates

TBD