Course Syllabus (CS455-071/091 Summer 2003)

**Instructor:**
Dr. Yonshik Choi  
choiy@iit.edu  (this email only for the class)  
Office Hour  Before or after class  
Phone  630.682.6021 (Do not leave a message)

**Teaching Assistant:**
Mr. Jaewon Lee  
leejaew1@iit.edu  
Office Hour  TBA at Rice campus  
Email consulting  Any time during semester  
Phone  N/A  
(There is no phone contact for TA at Rice campus. Please use email contact for remote people.)

**Class Web Page:**  
http://www.cs.iit.edu/~cs455yc/  
Need to visit as frequent as you can. No announcement for web contents updates. It’s a sole responsibility of student to visit class web page to get the most up-to-date information.

**Class Mailing List:**
Follow the instruction of the class web for the mailing list at the first week. If you don’t provide your email address to your TA at the first week, you will not get important class after hours communications from instructor and TA.

**Textbook (required):**

**References (optional):**
A. Tanenbaum, Computer Networks, Prentice-Hall, latest edition,  

**Objective:**
Provide the student with an overall perspective of data communications by covering the fundamentals of transmitting data from a source to one or more destinations utilizing standard protocols operating over networks with various topologies.

The emphasis is on two low layers of ISO OSI such as transmission media, data encoding, compression, protocol basics of error control, flow control, data link control protocol. It also covers internetworking, point-to-point wide area networks (WAN), including the Internet, multiple access local area networks (LANs), and emerging communication technologies such as ATM, Optical networking*, MPLS*, xDSL*, DQSA*, and wireless applications* such as voice/fax messaging*, SMS*, and unified messaging*. Provide also broad computer networking technologies and practical use so that people can have right vision for fast developing communication area.
• Understand the operation of multi-layered protocols, particularly the OSI and Internet models / architectures and how standards evolve.

• Describe the difference between different network topologies, including packet and circuit switched, LANs and WANs, and identify and describe networks that apply to each network type.

• Understand the basic concepts of the Physical Layer: including physical media, encoding / modulation, multiplexing, error control, and their implementation in various commercial networks.

• Describe the basic operation of the Data Link Layer, including connection oriented versus connectionless protocols, retransmission algorithms, windows and flow control, and their implementations in various networks.

• Describe the basic operation of the network layer, including addressing and routing.

• Describe the basic operation of TCP/UDP, including connection establishment and release, buffered transfer, adaptive retransmission, and congestion and flow control.

• Describe LAN architectures and their implementations.

• Introduce Application layer concepts, including commercial Internet protocols and client-server technologies.

• Introduce special issues, including security, performance, and quality of service from a technical and ethical viewpoint.

• Tie in all above concepts to describe the global data / telecommunications network.

* Those topics are extra topics only in this class and may be discussed briefly time to time. There are no prescheduled lectures for those topics in regular class schedule. Those topics may not be covered due to regular class schedule.

Pre-requisites and expected background:
CS455 is a senior course in Computer Science and as such expects its students a reasonable level of mathematical and computing sophistication. Physical phenomena such as electrical signals are discussed but no background beyond high school physics is assumed. Discussion of the software aspects of data communications assumes a knowledge of: operating systems, data structures, and the organization of reasonably complicated programs. The ability to design and write computer programs using "C/C++" or any other programming languages in an MS-DOS/Windows environment, and access to a DOS/Windows-based PC are prerequisites.

Assignments:
There will be regular homework assignments and at least one simulation programming assignment.
Grading:

The final grade for the course will be based upon the total number of points allocated (approximately) as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
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<tbody>
<tr>
<td>Midterms</td>
<td>30%</td>
</tr>
<tr>
<td>Homework Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Simulation assignment</td>
<td>15%</td>
</tr>
<tr>
<td>Final exam</td>
<td>35%</td>
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</tbody>
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**Final Grade**

- $A \geq 90$
- $80 \leq B < 90$
- $70 \leq C < 80$
- $65 \leq D < 70$
- $E < 65$

Note: There is no D grade for graduate level students. Thus lower than 70 will get E grade for graduate level.