**Computer Networking, Spring 2015**

**Syllabus**

**Description**

This course focuses on the exciting, dynamic topic of computer networks and features the Internet and a top down approach. The goal of this course is to get the students some insight into the rationale of why networks are structured the way they are today, to understand the key issues in computer network design and to master the principles for solving the issues. It covers fundamentals, concepts, architecture, principles and important protocols for computer networks.

In the application layer, typical applications and their protocols will be discussed, including Web and HTTP, File Transfer and FTP, Email and SMTP, Naming Service and DNS, and Peer-to-Peer. In the transport layer, UDP and TCP will be introduced. In addition, the principles of reliable data transfer and congestion control will be covered. In the network layer, we will learn the basics of a router, IP protocol, routing algorithms, and Internet routing protocols. In the link layer, we will learn error detection and correction, media access control, Link-layer addressing, Ethernet, Switches, PPP, Virtualization. We don't explicitly learn stuffs in the physical layer. However, we will also cover other important topics including wireless and mobile network, multimedia network, and network security.

In this course, the students are expected to under the key concepts and learn the principles that underline today's computer network. And, they will develop network applications and learn network programming with sockets. In addition, the course will introduce the students with hot research frontiers in computer networks, such as wireless sensor network, Internet of things, etc.

**Prerequisite**

There are actually no prerequisite courses for this courses. However, the following programming courses would certainly be a plus.

- Programming with C++ or Java (socket programming)

- Operating System (thread concept)

**Textbook & Reference books**

**Textbook**

- Computer Networking: A Top-Down Approach, 4th Ed.; J. F. Kurose and K. W. Ross. Addison Wesley.

**Reference books**

- Computer Networks  (4th Ed.), by Andrew S. Tanenbaum, Prentice Hall

- Data and Computer Communications (6th Ed.), William Stallings, Pearson Education.

- Computer Networks: A Systems Approach. Larry S. Peterson, Bruce Davie. The Morgan Kaufmann Series in Networking.

**Course Outline**

* Course Organization and Logistics: 2
* Introduction: 6
* Application layer  (Web & HTTP, FTP, SMTP, DNS, Peer-to-Peer): 8
* Transport layer (UDP, TCP, Reliable Data Transfer Principles, Congestion Control Principles): 6
* Network layer (Router, IP, Routing Algorithms, RIP, OSPF, BGP, Broadcast and Multicast): 8
* Data link layer and local area networks (Error detection and correction, MAC, Link-layer addressing, Ethernet, Switches, PPP, Virtualization): 8
* Wireless and Mobile Networks (CMDA, WLAN, Cellular Internet Access, Mobility management principles, Mobile IP, Mobility in Cellular Networks): 8
* Multimedia network, security and recent progress: 2

**Grading Scheme**

Final exam 50%

In-Class Quiz 20%

Attendance and Homework 15%

Term Project 15%

**Course Policies**

No late submission of homework.

No plagiarism is tolerated.