CS453: Data Communications and Networking (Spring 2015)

Instructor
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Course Format and Credit hours
3 hr Lecture / Presentations
3 hr Credit

Prerequisites
CS 350

Schedule
TR 12:30 – 1:45

Location
801 ESB

Office Hours
TR 11:00 am to 12:15 p.m. or by appointment; Location ESB 727

Course Objectives
This course is intended to provide an introduction to the design of computer networks. The Internet will be used as a case study. We will study a layered architecture for the design of computer networks and network protocols for the design of each layer. Apart from the syntax and semantics of the different network protocols, a particular emphasis will be laid on the *principles behind designing protocols that are scalable and fault-tolerant*. We will also study about some recent advances and research topics in the field of networking.

Expected learning outcomes
Upon completing this course, the student will:
1. become familiar with layered communication architectures
2. understand the design of network protocols for different layers
3. become familiar with the TCP/IP protocol suite
4. learn socket programming and how to implement client/server programs
5. learn about the architecture and design of wireless and mobile networks, especially 802.11 (wi-fi) and learn about some recent advances like vehicular and sensor networks

Detailed list of topics
- History of the Internet, Quality of Service (QoS) in the Internet
- Application layer protocols (HTTP, FTP, SMTP), Application models (client-server, peer-peer)
- Socket programming in Java (client-server and web server programs)
- Transport layer: Reliable data transfer, TCP, Principles of congestion control
- Routing layer: IP, Principles of routing, routing algorithms for Internet, switches
- Link layer: Error detection including checksums and CRC, Ethernet, switching and bridging
- Wireless and mobile networks, 802.11 in depth
- Recent advances and research topics in networking

Programming assignments (tentative)
Multi-threaded web server
Ping client and server
Recursive ping-pong
Wireshark packet analysis

Grading
4 Homework Assignments (10%)
6 Quizzes (25%)
3 Programming assignments (20%)
1 Mid-term (20%)
1 Final (25%)

Textbook
James E. Kurose and Keith W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*,
Fifth Edition
Online resources available at
http://wps.aw.com/aw_kurose_network_4/63/16303/4173750.cw/index.html

Grading Policy
No make-up exams except by prior arrangement with instructor
Late assignment = no assignment
Exam grading appeals in writing on the day the exam is returned.

Attendance Policy
Consistent with WVU guidelines, students absent from regularly scheduled examinations because of authorized University activities will have the opportunity to take them at an alternate time.   Make-up exams for absences due to any other reason will be at the discretion of the instructor.

Social Justice Statement
West Virginia is committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class. Please advise me and make appropriate arrangement with Disability Services (293-6700).

Integrity Statement
The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code at http://www.arc.wvu.edu/admissions/integrity.html. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.