

COE 344: Computer Networks (3-3-4) Term 092 (Spring 2009)

Syllabus

Instructor: Dr. Abdulaziz Barnawi
Lecture: S.T: 8:30-9:45 AM
Location: Bldg. 24-108
Office hours: U.T.: 11-11:50 am or by appointment
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Catalog Description:

This course will be taught using TCP/IP top-down approach. Topics covered include introduction to computer networks. Application layer design issues and protocols are discussed. Then, Transport layer design issues, protocols as well as congestion control mechanisms are presented. Socket programming is explained. An in-depth analysis is presented of the Network layer design issues, and internetworking. MAC layer design issues and protocols are presented. Finally, multimedia network applications are explored.

Prerequisite: COE 341 - Data and Computer Communications.

Textbook:

Computer Networking: A Top-Down Approach Featuring the Internet, J. Kurose & K. Ross, Addison Wesley, 4th Edition, 2008.

Tentative Grading Policy:

| | |
|---------------|-----------------------|
| Homeworks | 10% |
| Quizzes | 10% |
| Lab | 15% |
| Major Exam I | 15% (Sunday March 28) |
| Major Exam II | 20% (Sunday May 23) |
| Final Exam | 30% |

Important Notes:

- Attendance is mandatory for all students. According to the university attendance rule, more than **6 unexcused absences** will result in a DN grade.
- Homeworks are due in class of the submission date or as softcopy mailed through Blackboard no later than 2:00PM and a hardcopy of the same document no later than 4:00PM. Otherwise the homework will not be accepted.
- *Check your exam schedule carefully. NO makeup exams.*
- Check the course webpage and your Blackboard for updates and announcements.
- Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated.

Tentative Class and Lab Schedule

| Week | Chapter | Topics | Lab |
|--------------------------------------|---------------------------------------|--|--|
| 1 | Introduction (Chapter 1) | <ul style="list-style-type: none"> • What is the Internet, What is a protocol? • Network Edge, Network Core, and Network Access & Physical Media • Delay and Loss in Packet-Switched Networks • Protocol Layers and Their Service Models • Internet Backbones, NAPs and ISPs • Brief History of Computer Networking and the Internet | <u>Introduction</u> : Lab setting, Network devices, etc. |
| 2 | Application Layer (Chapter 2) | <ul style="list-style-type: none"> • Principles of Application Layer Protocols • The World Wide Web: HTTP • File Transfer: FTP | <u>Lab1</u> : Networking Tools - OS and LAN implementation |
| 3 | | <ul style="list-style-type: none"> • Electronic Mail in the Internet • The Internet's Directory Service: DNS | <u>Lab2</u> : Application Layer - HTTP, FTP, and TFTP Services |
| 4 | | <ul style="list-style-type: none"> • P2P File Sharing | <u>Lab3</u> : Application Layer - DNS, SMTP, and POP3 |
| 5 | Transport Layer (Chapter 3) | <ul style="list-style-type: none"> • Transport-Layer Services and Principles • Multiplexing and Demultiplexing Applications | <u>Lab4</u> : Socket Programming |
| 6 | | <ul style="list-style-type: none"> • Connectionless Transport: UDP • Principles of Reliable of Data Transfer: TCP case study | <u>Lab5</u> : Review |
| 7 | | Major Exam I – Sunday March 28 | <u>Lab6</u> : Transport Protocol Analysis – TCP & UDP |
| | | <ul style="list-style-type: none"> • Principles of Congestion Control | |
| 8 | Network Layer (Chapter 4) | <ul style="list-style-type: none"> • Introduction and Network Service Models • What is Inside a Router? • IP: the Internet Protocol | <u>Lab7</u> : IPv4 & IPv6 Addressing |
| Mid-Term Vacation 17-21 April | | | |
| 9 | | <ul style="list-style-type: none"> • Routing Algorithms • Hierarchical Routing • Routing in the Internet | <u>Lab8</u> : Network Protocol Analysis - IP |
| 10 | Link Layer & LANs (Chapter 5) | <ul style="list-style-type: none"> • Link Layer: Introduction & Services • Multiple Access Protocols and LANs | <u>Lab9</u> : Dynamic Routing Protocols: RIPv1, and RIPv2 |
| 11 | | <ul style="list-style-type: none"> • LAN Addresses and ARP • Ethernet • Hubs, Bridges and Switches | <u>Lab10</u> : Routing Between LANs using OSPF, and ICMP |
| 12 | | <ul style="list-style-type: none"> • PPP: the Point-to-Point Protocol • Link Virtualization: ATM | <u>Lab11</u> : IEEE 802.3, ARP |
| 13 | Wireless & Mobile Nets (Chapter 6) | Major Exam II – Sunday May 23 | <u>Lab12</u> : Trunking, Virtual LAN (VLAN), and L3 Routing |
| | | <ul style="list-style-type: none"> • Wireless Links & Network Characteristics CDMA | |
| 14 | | <ul style="list-style-type: none"> • Wireless LANs: IEEE 802.11 WPAN & Bluetooth | <u>Lab13</u> : DHCP, NAT, and Access List |
| 15 | | <ul style="list-style-type: none"> • Mobile networking (introduction) | Final Lab Exam |

| Course Learning Outcomes | Outcome Indicators and Details | Assessment Methods and Metrics | ABET 2000 Criteria | Outcome (Minimum Weight) |
|---|--|---|--------------------|--------------------------|
| 1. Ability to apply knowledge of mathematics, probability, and statistics to model and analyze some networking protocols. | <ul style="list-style-type: none"> • Packet and circuit switching modeling, analysis, and comparison. • Modeling of some MAC protocols. | <ul style="list-style-type: none"> • Assignments • Quizzes • Exams | A(M) | 18% |
| 2. Ability to design, implement, and analyze simple computer networks. | <ul style="list-style-type: none"> • Experiments on LAN design and implementation. • Protocol analysis. • Use of networking tools. | <ul style="list-style-type: none"> • Lab assignments • Lab work | B(L) | 6% |
| 3. Ability to identify, formulate, and solve network engineering problems. | <ul style="list-style-type: none"> • Identify and solve reliable data transfer problems over IP Networks. • Identify and solve network addressing problems. • Identify, compare, and contrast different routing protocols. | <ul style="list-style-type: none"> • Assignments • Quizzes • Exams • Lab work | E(H) | 35% |
| 4. Knowledge of contemporary issues in computer networks. | <ul style="list-style-type: none"> • Contemporary networking technologies. | <ul style="list-style-type: none"> • Assignments | J(L) | 5% |
| 5. Ability to use techniques, skills, and modern networking tools necessary for engineering practice. | <ul style="list-style-type: none"> • Setup networking services. • Setup and basic configuration of networking devices. • Networking tools. • Traffic analyzers. • Troubleshooting network problems. • Different operating systems. | <ul style="list-style-type: none"> • Lab work. | K(L) | 9% |