

King Fahd University of Petroleum and Minerals
College of Computer Sciences and Engineering
Department of Computer Engineering
COE 344 Computer Networks (3-3-4)

Instructor: Dr. Marwan Abu-Amara
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Term: 101 (1st term 2010–2011)
Day & Time: UT 07:00 AM – 08:15 AM
Location: 22-130
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.
Office Hours: UT 08:30 AM – 09:45 AM or by appointment
Web Site: <http://faculty.kfupm.edu.sa/COE/marwan>

Tentative Grading Policy:

- Homeworks **10%**
- Quizzes..... **10%**
- Lab **15%**
- Major Exam I **15%** (Week 06 - Tuesday November 02, 2010 during class period)
- Major Exam II..... **20%** (Week 12 - Tuesday December 21, 2010 during class period)
- Final Exam..... **30%** (*Comprehensive*)

IMPORTANT NOTES:

- All KFUPM regulations and standards will be enforced. Attendance will be checked each class. The KFUPM rule pertaining to a DN grade will be strictly enforced (i.e. > **6 absences** will result in a DN grade). *Check your university e-mail regularly for warnings regarding your absences.*
- If you are late to the class for more than 10 minutes (i.e. arrive after 07:10 AM), you will **NOT be allowed to enter** the classroom and you will be considered absent for that class.
- Only university approved/certified excuses will be accepted.
- Homeworks are to be submitted **in class** on the due date during the class period. Late homeworks will **NOT be accepted**.
- You have 48 hours to object to the grade of a homework, a quiz, or a major exam from the end of the class time in which the graded papers have been distributed back. If for some reason you cannot contact me within this period, send me an email requesting an appointment. The email should be sent within the 48-hour time period.
- **NO make up exams.** ALL homeworks and quizzes will be counted towards your grade.
- Final exam is **comprehensive**.

Tentative schedule

| Week | | Topic | Lab Experiments |
|--|---|--|--|
| 1 | Introduction (Chapter 1) | 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) | Principles of Application Layer Protocols The World Wide Web: HTTP File Transfer: FTP | <u>Lab1</u> : Networking Tools - OS and LAN implementation |
| 3 | | Electronic Mail in the Internet The Internet's Directory Service: DNS | <u>Lab2</u> : Application Layer - HTTP, FTP, and TFTP Services |
| 4 | | P2P File Sharing | <u>Lab3</u> : Application Layer - DNS, SMTP, and POP3 |
| 5 | Transport Layer (Chapter 3) | Transport-Layer Services and Principles Multiplexing and Demultiplexing Applications | <u>Lab4</u> : Socket Programming |
| 6 | | Connectionless Transport: UDP Principles of Reliable of Data Transfer: TCP case study Principles of Congestion Control | <u>Lab5</u> : Review |
| 7 | | Principles of Congestion Control | <u>Lab6</u> : Transport Protocol Analysis – TCP & UDP |
| Id al-Adha Vacation (November 11th, 2010 – November 21st, 2010) | | | |
| 8 | Network Layer (Chapter 4) | Introduction and Network Service Models What is Inside a Router? IP: the Internet Protocol | <u>Lab7</u> : IPv4 & IPv6 Addressing |
| 9 | Network Layer (Chapter 4) | Routing Algorithms Hierarchical Routing Routing in the Internet | <u>Lab8</u> : Network Protocol Analysis - IP |
| 10 | Link Layer & LANs (Chapter 5) | Link Layer: Introduction & Services Multiple Access Protocols and LANs | <u>Lab9</u> : Dynamic Routing Protocols: RIPv1, and RIPv2 |
| 11 | | LAN Addresses and ARP Ethernet Hubs, Bridges and Switches | <u>Lab10</u> : Routing Between LANs using OSPF, and ICMP |
| 12 | | PPP: the Point-to-Point Protocol Link Virtualization: ATM | <u>Lab11</u> : IEEE 802.3, ARP |
| 13 | Wireless & Mobile Net (Chapter 6) | Wireless Links & Network Characteristics, CDMA Wireless LANs: IEEE 802.11 WPAN & Bluetooth Mobile networking (introduction) | <u>Lab12</u> : Trunking, Virtual LAN (VLAN), and L3 Routing |
| 14 | Multimedia Networking (Chapter 7) | Multimedia Networking Applications Streaming Stored Audio and Video | <u>Lab13</u> : DHCP, NAT, and Access List |
| 15 | | Making the Best of the Best-Effort Service: An Internet Phone Example Protocols for Real-Time Interactive applications | Final Lab Exam |

* Week 1 begins on *September 25, 2010*

Course Learning Outcomes

| Course Learning Outcomes | Outcome Indicators and Details | Assessment Methods and Metrics | Min. Weight | ABET 2000 Criteria |
|---|--|---|-------------|--------------------|
| 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 | 18% | A (M) |
| 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 | 6% | B (L) |
| 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 | 35% | E (H) |
| 4. Knowledge of contemporary issues in computer networks. | <ul style="list-style-type: none"> • Contemporary networking technologies. | <ul style="list-style-type: none"> • Assignments | 5% | J (L) |
| 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 | 9% | K (L) |