

**King Fahd University of Petroleum and Minerals**  
**College of Computer Sciences and Engineering**  
Department of Computer Engineering

COE 444 Internetwork Design and Management (3-0-3)

**Instructor:** Dr. Marwan Abu-Amara  
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**Term:** 091 (1<sup>st</sup> term 2009–2010)  
**Day & Time:** UT 10:00 AM – 11:15 AM  
**Location:** 24-108  
**Prerequisite:** COE 344 (Computer Networks) or consent of instructor  
**Textbook:** *Top-Down Network Design*, P. Oppenheimer, Cisco Press, 2<sup>nd</sup> Edition, 2004.  
**Office Hours:** UT 08:30 AM – 09:45 AM or by appointment  
**Web Site:** <http://faculty.kfupm.edu.sa/COE/marwan>

**Catalog Description:**

Types of computer networks. Principles of internetworking. The network development life cycle. Network analysis and design methodology. Internetworking hardware. Connectionless internetworking. Connection-oriented internetworking. Routing strategies. Structured wiring and backbone design. OSI internetworking. Network management (SNMP). Network security and firewalls. Network administration. Case studies.

**Tentative Grading Policy:**

- Homeworks ..... **10%**
- Quizzes ..... **10%**
- Project ..... **15%**
- Major Exam I ..... **20%** (Sunday November 15, 2009 during class period)
- Major Exam II ..... **20%** (Sunday January 10, 2010 during class period)
- Final Exam ..... **25%** (*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 10:10 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
1	<b>Overview of Computer Networks:</b> Types of computer networks. LANs and WANs. Protocols and protocol families. The OSI reference model. The TCP/IP protocol.
2-5	<b>Internetworking:</b> Basic terminology. Principles of internetworking. Types of internetworking devices. Repeaters, hubs, bridges, routers, switches and gateways. Transparent and source-routing bridges. Multilayer switches. VLANs. Routing strategies. Addressing.
6	<b>The Network Development Life Cycle:</b> Network analysis. Network design methodology. Writing of a Request For Proposal (RFP) and quotation analysis. Prototyping/simulation. Implementation.
7	<b>Enterprise Network Design:</b> Enterprise Network Design Model. Backbone design concepts. Network security and firewalls. Structured cabling systems. Case studies.
<b>Eid Al-Adha (November 21<sup>st</sup>, 2009 – December 2<sup>nd</sup>, 2009)</b>	
8-9	<b>Enterprise Network Design:</b> Enterprise Network Design Model. Backbone design concepts. Network security and firewalls. Structured cabling systems. Case studies.
10-12	<b>Topology design and analysis:</b> Topology design. Network design algorithms. Terminal assignment. Concentrator location. Traffic flow analysis and performance evaluation. Network reliability.
13-14	<b>Network Management:</b> Network management standards & models. ISO Functional areas of management. Network management tools and systems. SNMP architecture & operations. Network administration. <b>Major Exam II (Sunday January 10<sup>th</sup>, 2010)</b>
15	<b>Project Presentations:</b> More details will be posted on the course web site about the project.

\* Week 1 begins on *October 03, 2009*

## Course Learning Outcomes

Course Learning Outcomes	Outcome Indicators and Details
1. Ability to apply knowledge of mathematics, probability, and statistics to model and analyze some network design problems.	<ul style="list-style-type: none"> <li>• Spanning tree</li> <li>• IP addressing</li> <li>• Traffic flow analysis</li> <li>• Performance evaluation</li> <li>• Network reliability</li> </ul>
2. Ability to analyze and design an enterprise network that meets desired requirements.	<ul style="list-style-type: none"> <li>• Network Development Life Cycle</li> <li>• Request for Proposal (RFP)</li> <li>• Network Analysis and Design methodology and process</li> <li>• Requirement analysis phase</li> <li>• Logical design phase (hierarchical model, backbone, redundancy, security, etc)</li> <li>• Physical design phase (structured cabling, etc.)</li> <li>• Assessment of the design</li> <li>• Project and case studies</li> </ul>
3. Ability to function as an effective team member in the analysis and design of an enterprise network.	<ul style="list-style-type: none"> <li>• Some assignments are done by teams</li> <li>• Project of an enterprise network analysis and design is assigned to teams</li> </ul>
4. Ability to identify, formulate, and solve network design problems	<ul style="list-style-type: none"> <li>• Network topology design problems</li> <li>• Terminal assignment problem</li> <li>• Concentrator location problem</li> <li>• Project and case studies</li> </ul>
5. Ability to demonstrate self-learning capability.	<ul style="list-style-type: none"> <li>• Ability to learn a course topic alone (e.g., concentrator location)</li> <li>• Assignment(s) on different design methodologies</li> <li>• Course Project may involve topics not studied in the course (e.g., requirement analysis, market survey)</li> </ul>
6. Ability to use techniques, skills, and modern networking tools necessary for network analysis, design, and management.	<ul style="list-style-type: none"> <li>• Guidelines and best practices for network analysis and design</li> <li>• SNMP protocol for managing a network</li> </ul>