

King Fahd University of Petroleum & Minerals
College of Computer Sciences and Engineering
Computer Engineering Department
COE 543 Mobile Computing and Wireless Networks (3-0-3)
Winter 2009/2010 (Term 092) - Syllabus

Course Objectives

Introduction to the relatively new area of mobile networks and wireless technologies and their impact on the design of lower level protocols.

Catalogue Description

Introduction to mobile and wireless networks. Designing computer networks to support computer mobility. Mobile network architecture. Wireless technologies and protocols. Wireless LAN standards. Models for indoor and outdoor mobile networks. Systems issues such as performance. Quality of service guarantees, reliability, and security in mobile computing environment. Hardware and access protocols for mobile networks. Mobile application protocols.

Prerequisite: *COE 540 (Computer Networks) or Consent of Instructor.*

Instructor: Dr. Ashraf S. Hasan Mahmoud.

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Class Hours/Place: SM 17:00 – 18:15 – Rm 24-125

Office hours: TBD or by appointment.

References: Keveh Pahlavan, Prashant Kishnamurthy, “Principles of Wireless Networks – A Unified Approach,” Prentice Hall Inc, 2002

Vijay K. Garg, Joseph E. Wilkes, “Wireless and Personal Communications Systems,” Prentice Hall Inc, 1996

Charles E. Perkins, “Mobile IP – Design Principles and Practices,” Addison-Wesley, 1997

Plus a number of papers to be announced as course progresses

Grading Policy:

Class Homework/Quizzes	25%	(Quizzes every other week)
Major Exam	20%	(TBD – class time preferred)
Term Project	25%	(Deliverables and dates will be outlined)
Final Exam	30%	Scheduled by the registrar

Tentative Course Plan

1. Introduction:

Introduce mobile and wireless networks – voice and data traffic models – efficiency metrics

2. RF Propagation Models

Radio wave propagation, Multi-path characteristic of radio wave, Short/long term fading, Indoor and Outdoor propagation models – Signal impairments (multipath, co-channel, etc.) and techniques for combating signal impairments.

3. Physical Layer for Wireless Systems

Applied wireless transmission techniques, carrier modulated transmission, traditional digital cellular transmission, spread spectrum transmission, diversity and MIMO systems, etc.

4. Multiple Access Techniques and Examples of Networks

Brief introduction of TDMA, FDMA, and CDMA technologies and their relative performance. Reference model for wireless and mobile networks. Examples: AMPS, GSM, cdma2000/UMTS, etc.

5. Cellular Configuration

Service area layouts – frequency/channel reuse concept – co-channel interference and signal quality calculations for omni/multi-sector antennas – Cell splitting – Call handoff and Mobility issues.

6. Advanced Wireless Networks

IEEE 802.11, Hiperlan, Bluetooth, WiMax, Mesh Networks.

7. Mobile IP

Reference model Mobile IPv4/IPv6, Routing issues, Mobile IP registration and tunneling, Mobility management. Session Initiation Protocol (SIP) and Mobile Stream Control Transmission Protocol (m-SCTP).

7. Privacy, Security and Authentication for Wireless Networks

8. Quality of Service and Mobile Applications