

King Fahd University of Petroleum & Minerals

Electrical Engineering Department
(First Semester 052)

EE577: Wireless & Personal Communications

17:00 to 18:15 (Saturdays and Mondays)

Course Objectives: This course is designed to introduce to the students a very exciting and rapidly expanding field of wireless communications. This course provides fundamentals of wireless communications and in-depth knowledge on radio signal propagation, mobile radio channel characteristics, digital transmission technologies, multiple access - FDMA, TDMA, and CDMA, mitigation of fading and interference and cellular systems principles and standards.

Pre-requisites: EE571 or permission of the instructor

Instructor: Professor Asrar U. H. Sheikh, Office: 14/263, Tele: 860 1182

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Course outline:

- Overview of mobile communications (2 lectures)
- Propagation and signal strength prediction (3 lectures)
- Mobile radio channel characterization: fading for narrowband and wideband signals (3 lectures)
- Digital Communications for mobile communications (3 lectures)
- Signal impairments and their mitigation: diversity and equalization (4 lectures)
- Multiple access Techniques and spectral efficiency: FDMA, TDMA and CDMA (4 lectures)
- Cellular radio principles: frequency and cell planning, interference, handoff, and power control (4 Lectures)
- Cellular radio standards and systems (4 lectures)

Text Book:

Wireless Communications: Principles and Practice, Second Edition 2002, Prentice-Hall

Lecture notes and handouts

References:

1. A. U. H. Sheikh, Wireless Communications: Theory & Techniques, Kluwer 2004.
1. J. Gibson, The Mobile Communications Handbook, CRC Press, 1996
2. V.K. Garg and J.E. Wilkes, Wireless and Personal Communications Systems, Prentice-Hall, 1996.
3. M. D. Yacoub, Foundations of Mobile Radio Engineering, CRC Press, 1993.
4. D.J. Goodman, Wireless Personal Communications Systems, Addison Wesley, 1998.
5. K. Pahlavan and A.H. Levesque, Wireless Information Networks, J. Wiley, 1995.
6. B. Bates, Wireless Networked Communications: Concepts, Technology, and Implementation, McGraw-Hill 1995.

Homework Assignments: One homework assignment approximately every two weeks.

Quizzes: Once every three weeks.

Research Paper:

The students are required to write a research paper on a selected or assigned topic. They must submit a proposal on the objectives and the work to be performed to the instructor by March 1, 2006 (the end of week 3) in order to get approval of the instructor. The research paper shall consist of a comprehensive literature survey on the topic, definition of the problem, proposed approach to solve the problem, justification of the approach, analysis of the proposed method, a summary of major findings, and conclusion. The paper must include simulation program, and simulation results. The final report must contain some element of research and should exhibit good understanding of the research topic. The conclusion of the research paper should be clear and concise. The report should be 15 to 20 typed pages using one and a half line spacing. A soft copy of the report in WORD format must accompany the hard copy of the report. The final report should be submitted at the end of week 13 of the semester (May 14, 2006). In the final week of the semester, students are required to make presentation of their work.

Grading Policy:

The students will be assigned grades on the basis of the following:

Home assignments:	15%
Quizzes:	15%
Research Paper:	30% (report 70% and presentation 30%)
Final Examination:	40%