

Introduction to Wireless (EE6390)

Spring 2000

Brief Description: This course is intended for graduate students who have basic familiarity with principles of communications systems. The key elements of wireless communications are introduced. The emphasis will be to provide exposure to a broad range of subject matters in this field. Subject matters such as modulation/coding and antennas/propagation will be covered in EE6391 and EE6392, respectively. Therefore, the coverage of these subject matters will be rather limited. The current as well as emerging wireless (cellular as well as PCS) technologies will be discussed briefly.

Instructor: Dr. Kamran Kiasaleh. EC3.528, (972)883–2990, (972)883–2710 (FAX)

Email:kamran@utdallas.edu

Office hours: 10:30– 11:30 am (M), 7:15–8:15 pm (W)

Tentative Grading Policy:

1. One Midterm (35%)
2. Final (40%)
3. HW (25%). Homework assignments are assigned weekly (or bi-weekly) and are due at *the beginning of the lecture on Wednesday of the week*. Late assignments will not be accepted (including those turned in at the end of the lecture period). The assignments will be posted to the web site: <http://www.utdallas.edu/~kamran/courses/EE6390/HW> no later than 12:00 pm on Thursday of the week. DO NOT FAX your assignments without the approval of the instructor. Solutions will be posted to <http://www.utdallas.edu/~kamran/courses/EE6390/Solutions>

Textbook

1. *Wireless Communications, Principles and Practice*, by T. S. Rappaport, Printice Hall.
2. Lecture notes (available at <http://www.utdallas.edu/~kamran/courses/EE6390/lectures>)
Lecture notes for the week will be made available at the above address on Friday of the preceding week. Lecture notes will be posted in pdf format.. **Although lecture notes are provided, you are strongly encouraged to take notes.**

List of Topics (tentative)

4. The Cellular Concept
 - Cellular Geometry
 - Frequency Planning
 - Channel Assignment
 - Handoff
 - Interference (co-channel, adjacent channel, etc.)
 - Spectral efficiency and Erlangian Capacity
 - Cell Splitting and Sectoring
1. Mobile Propagation Channel
 - Large Scale
 - Small Scale Fading and Multipath
1. Multiple Access techniques for Wireless Communications/Wireless Systems and Standards
 - Time-Division Multiple-Access (TDMA)
 - Frequency-Division Multiple-Access (FDMA)
 - Frequency-Hopped Multiple-Access (FHMA)

- Code–Division Multiple–Access (CDMA)
- Space–Division Multiple–Access (SDMA)
- Hybrid systems
- Current and emerging standards, such as AMPS (analog) and ETACS (analog), EIA/TIA IS–136, ANSI–95 (CDMAOne), UWC–136, GSM, W–CDMA, DECT, PACS, CT2, etc.
- Capacity consideration

4. Wireless Networking

- Public Switched Telephone Network (PSTN)
- Mobile Switching Center (MSC)
- 1st, 2nd, and 3rd generation wireless networks
- Traffic routing in wireless networks
- Wireless data services (Cellular Digital Packet Data (CDPD), RAM Mobile Data, 3rd generation wireless systems)
- Common Channel Signaling (SS7)