

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
ELECTRICAL ENGINEERING DEPARTMENT
Second Semester (012)

EE 577 Wireless and Personal Communications

- **Prerequisites:** EE571 or Consent of Instructor.
- **Instructor:** Dr. Saud A. Al-Semari, Office: 14/278, Phone: x-2089
E-mail: semari@kfupm.edu.sa
- **Course Description:** The Cellular concept, Propagation modeling, Digital transmission techniques, multiple access techniques, Cellular frequency planning, Link control, Handoffs, Power control, Traffic capacity, Wireless networking, Privacy and security of wireless systems, Examples of current wireless systems standards.
- **Course Outline:**
 - **Overview:** (1 lecture)
 - **Fundamentals of Cellular Systems:** (4 lectures) Basic building blocks, the cellular concept, handovers, power control, traffic engineering.
 - **Propagation Aspects:** (5 lectures)
Antennas, large-scale effects, small-scale effects, propagation models.
 - **Speech Coding:** (1 lecture)
Introduction to speech codecs that are used in mobile communication systems.
 - **Modulation Techniques:** (3 lectures)
Continuous phase modulation, minimum shift keying, $\pi/4$ -quadrature phase shift keying, spread spectrum modulation (PN sequences and frequency hopping).
 - **Mitigation Techniques:** (3 lectures)
Equalization, diversity and channel coding.
 - **Multiple Access Techniques:** (3 lectures)
Frequency division multiple access, time division multiple access and code division multiple access, random access techniques.
 - **Wireless Standards and Systems:** (8 lectures)
AMPS, GSM, IS-136, cdmaOne, UMTS, cdma2000, Wireless LANs, BWA.

- **Textbook:**

- T. Rappaport, *Wireless Communications: Principles and Practice*, Prentice-Hall, second edition.
- Lecture notes.

- **References:**

1. *IEEE Personal Communications Magazine*
2. *IEEE Transactions on Wireless Communications*
3. J. Gibson, *The Mobile Communications Handbook*, CRC press, 1996.
4. V. K. Garg and J. E. Wilkes, *Wireless and Personal Communications Systems*, Prentice-Hall, 1996.
5. K. Feher, *Wireless Digital Communications, Modulation and Spread Spectrum Applications*, Prentice-Hall, 1996.
6. R. Steele, *Mobile Radio Systems*, IEEE press, 1992.
7. S. Wilson, *Digital Modulation and Coding*, Prentice-Hall, 1995.
8. W. Jakes, *Microwave Mobile Communications*, IEEE press, 1975.

- **Homework Assignments** will be issued about once every two weeks. They are to be worked out individually.

- **Grading Policy**

- Homework 30%
- Project 35%
- Final Exam 35%