

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
ELECTRICAL ENGINEERING DEPARTMENT
Second Semester (052)

EE 499 - Wireless and Mobile Communications

- **Prerequisites:** EE 370 and EE 315.
- **Instructor:** Dr. Salam A. Zummo
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Web Site: <http://faculty.kfupm.edu.sa/ee/zummo/courses.htm> or WebCT
- **Course Description:** The cellular concept, cellular frequency planning, link control, handoffs, power control, traffic capacity, propagation modelling, digital transmission techniques, fading mitigation, multiple access techniques, wireless networking, examples of current and future wireless standards.
- **Course Outline:** (Time and emphasis may be adjusted as needed)
 - **Overview:** (1 lecture)
 - **Fundamentals of Cellular Systems:** (3 lectures)
The cellular concept, basic building blocks of cellular systems, handoffs, 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)
Digital modulation techniques, spread spectrum modulation (direct sequence and frequency hopping), orthogonal frequency-division multiplexing (OFDM).
 - **Mitigation Techniques:** (2 lectures)
Equalization, diversity, channel coding.
 - **Multiple Access Techniques:** (3 lectures)
Frequency division multiple access, time division multiple access, code division multiple access and random access techniques.
 - **Wireless Standards and Systems:** (10 lectures)
GSM, IS-95, UMTS, wireless LANs, Bluetooth, WiMAX.

- **Textbook:**

- Theodore Rappaport, *Wireless Communications: Principles and Practice*, Pearson Education Inc., 2nd edition, 2002.
- Lecture notes.

- **References:**

1. *IEEE Personal Communications Magazine*.
2. S. Haykin and M. Moher, *Modern Wireless Communications*, Pearson Education Inc., 2005.
3. William Stallings, *Wireless Communications and Networking*, Prentice-Hall, 2002.
4. J. Gibson, *The Mobile Communications Handbook*, CRC press, 1996.
5. V. K. Garg and J. E. Wilkes, *Wireless and Personal Communications Systems*, Prentice-Hall, 1996.
6. K. Feher, *Wireless Digital Communications, Modulation and Spread Spectrum Applications*, Prentice-Hall, 1996.
7. R. Steele, *Mobile Radio Systems*, IEEE press, 1992.
8. S. Wilson, *Digital Modulation and Coding*, Prentice-Hall, 1995.

- **Grading Policy**

- Quizzes (6) 15%
- Exam I 20% Tuesday of Week 6 (Class time)
- Exam II 20% Tuesday of Week 11 (Class time)
- Term Project 10%
- Final Exam 35%