

COURSE INFORMATION

ECSE413B: COMMUNICATIONS SYSTEMS II

Tuesday/Thursday, 8:35-9:55, ENGTR2120
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CONTENTS:

The objective of this course is to provide a solid foundation in applications of digital transmission techniques to communications system design with special emphasis on wireless communications. The following subjects will be covered:

- A. Introduction:** Digital Communications Systems • Communications Resources • Transmissions Media • Quality of Services • Noise • Overview of Wireless Communications and Networking
- B. Wireless Channel Modeling:** Point-to-Point Wireless Line-of-Sight (LOS) Link: Propagation, LOS Link Engineering, Fades, Fade Margin • Multipath Propagation • Linear Time-Variant Channel Model • Channel Correlation Functions • Large-Scale Path Loss and Shadowing • Small-Scale Multipath Fading
- C. Digital Transmission Techniques for Wireless Mobile Communications:** Digital Modulation Techniques: PSK, QAM • Probability of Error • Power Spectral Density • Power and Bandwidth Efficiency • Overview and Concepts of Error Control Coding • Receiver Techniques for Fading Dispersive Channels: Diversity • Equalization • OFDM
- D. Multiple-Access Techniques:** FDMA • TDMA • CDMA • Fixed and Dynamic Capacity Allocation
- E. Digital Communications Systems and Standards:** Cellular Communications Systems: Frequency Reuse, Interference Considerations, System Capacity, System Architectures • Satellite Communications • xDSL • WLAN & WiFi/802.11 • WiMAX/802.16 • UWB • Blue-Tooth • ZigBee.

REQUIREMENTS & REFERENCES:

Course Notes based on the following references:

J. Mark, W. Zhuang, *Wireless Communications and Networking*, Prentice-Hall, 2003

P.M. Shankar, *Introduction to Wireless Systems*, John Wiley & Sons, 2002

S. Haykin, *Communication Systems*, 4th Edition, John Wiley & Sons, 2001

T.S. Rappaport, *Wireless Communications: Principles and Practice*, 2nd Ed, Prentice-Hall, 2002
and related technical papers.

MARKING:

- Assignment (15%);
- Term-Project (15%);
- Open-book Exams:
 - Midterm (30%): THURSDAY, March 13/2008
 - Final (40%)

YOUR FINAL MARK=MAX (M1, M2)

WHERE: $M1 = (\text{ASG} + \text{MIDTERM} + \text{FINAL} + \text{PROJECT})$, $M2 = (\text{ASG} + \text{FINAL} + \text{PROJECT}) / 0.70$

GRADING:

$A \geq 85\%$, $A- \geq 80\%$, $B+ \geq 75\%$, $B \geq 70\%$, $B- \geq 65\%$, $C+ \geq 60\%$, $C \geq 55\%$, $D \geq 50\%$, $F < 50\%$