

EEEN 474
Wireless Communication
Spring 2020

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Office Hours: Monday 13:00-15:00
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Course description

Modern Wireless Communication Systems. The Cellular Concept – System Design Fundamentals. Mobile Radio Propagation: Large-Scale Path Loss; Small-Scale Fading and Multipath. Modulation Techniques for Mobile Radio. Equalization, Diversity, Channel Coding. Multiple Access Techniques for Wireless Communication.

Course Learning Outcomes

Subsequent to the successful completion of this course, students will be able to

1. Define and discuss the wireless and cellular communication system design fundamentals.
2. Compute mobile radio propagation and path loss.
3. Compute channel characterization; Analyze fast and slow fading.
4. Compute frequency selectivity, delay and spread coherence bandwidth.
5. Use modulation techniques. Design equalization and diversity. Use multiple access techniques.
6. Design wireless networking. Analyze wireless standards.

Prerequisite (as special condition): EEEN 322

Recommended text book: T. S. Rappaport, "Wireless Communications: Principles & Practice," 2nd Ed., Prentice-Hall: Upper Saddle River, NJ, 2002

Requirements

1. Students must attend at least 70% of the lectures.
2. Students who miss a lecture are fully responsible for obtaining the material they missed.
3. Late assignments will lose 20% of their total grades per day. Assignments returned after the third day following the deadline will not be accepted.
4. Adherence to the University Academic Integrity policy is expected.

Grading

| Evaluation Type | Number | Percentage |
|-----------------|--------|------------|
| Quizzes | 2 | 15 |
| Homeworks | 2 | 10 |
| Midterm Exam | 1 | 30 |
| Final Exam | 1 | 45 |
| TOTAL | | 100 |

Tentative Schedule

| Date | Topic |
|---------|--|
| Week 1 | Define and discuss the cellular & wireless communication system design fundamentals. |
| Week 2 | Mobile radio propagation and path loss. |
| Week 3 | Mobile radio propagation and path loss. |
| Week 4 | Channel characterization, fast and slow fading. |
| Week 5 | Channel characterization, fast and slow fading. |
| Week 6 | Midterm exam |
| Week 7 | Frequency selectivity, delay and spread coherence bandwidth. |
| Week 8 | Signal loss probability, interference environments and its control, frequency control, diversity techniques for digital land mobile radio. |
| Week 9 | Signal loss probability, interference environments and its control, frequency control, diversity techniques for digital land mobile radio. |
| Week 10 | Spatial distribution of offered traffic, efficient spectral utilization, capacity calculations and networking. |
| Week 11 | Spatial distribution of offered traffic, efficient spectral utilization, capacity calculations and networking. |
| Week 12 | Equalization and diversity. |
| Week 13 | Multiple access techniques. |
| Week 14 | Wireless networking and wireless standards. |