Mobile Communication Systems

ECE 732

Fall 2018

Instructor Prof. B.-P. Paris
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Time and Place Tuesday 7:20–10:00 pm
Music and Theater Building, room 1002.

Office Hours Tuesday 5:00–6:00 pm, Monday 10:00–11:00 am, or by appointment.

Textbooks Andrea GoldSmith, *"Wireless Communications"*, Cambridge, 2005.

Recommended Reading

1. Tse and Viswanath, *"Fundamentals of Wireless Communication"*, Cambridge, 2005.
2. Gordon L. Stüber, *"Principles of Mobile Communication"*, Kluwer Academic Publishers, 2nd Ed., 2001.
3. J.G. Proakis and M. Salehi, *Contemporary Communication Systems using MATLAB*, Brooks/Cole, 2000.
4. J.G. Proakis and M. Salehi, *"Digital Communications"*, McGraw-Hill, 5th Edition.

Course WWW Page All course material and important announcements can be found on the World Wide Web at URL `http://www.spec.gmu.edu/~pparis/classes/ece732.html`. There is also a course page on Mason's BlackBoard system.

Homework Homework will be assigned most weeks and is due the following week. Some of the assignments are best solved using Matlab. You are encouraged to work on the assignments in small groups.

Two Exams will be given: one midterm exam and a comprehensive final exam.

Project: A design or research project will be assigned early in the semester and is to be presented in the last class.

All exams and projects are conducted under the rules and regulations of the **Honor Code** (see University Catalog).

Final Grades are determined as a weighted average of homeworks and exams in the following way:

Homework	10%
Midterm	30%
Final	30%
Project	30%

Tentative Course Schedule

Week 1

Introduction: Historical development, fundamental ideas and definitions in mobile communication systems, comparison with fixed networks.

Week 2

Brief Review: Optimum receiver principles, baseband equivalent signals.

Weeks 3–4

The Mobile Communication Channel: path loss and link budget, multipath fading, shadowing, Doppler effect.

Week 5–6

Performance of digital communication systems over multipath, fading channels.

Week 7

Midterm

Weeks 8–11

The critical importance of diversity for wireless communications: Transmitter and receiver divsersity, time diversity (coding and interleaving), frequency diversity (equalization for single-carrier signals, OFDM), and spatial diversity

Week 12

Capacity of Wireless Channels: AWGN and fading channels.

Week 13

Introduction to MIMO: from spatial multiplexing to MIMO architectures.

Week 14

Project Presentations

Dec. 18: 7:30 — 10:15, Final Exam.