Mobile Communication Systems
ECE 732
Fall 2018

Instructor  Prof. B.-P. Paris
Engineering Building, Room 3205
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WWW: http://www.spec.gmu.edu/~pparis

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.


Recommended Reading


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:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm</td>
<td>30%</td>
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<tr>
<td>Final</td>
<td>30%</td>
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<tr>
<td>Project</td>
<td>30%</td>
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**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 diversity, 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.