Statistical Communication Theory

ECE 630

Spring 2018

Instructor  Dr. B.-Peter Paris  
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Time and Place  Tuesday 4:30pm — 7:10pm, Krug Hall Hall, Room 242

Office Hours  Tuesday 3:00pm — 4:00pm and Thursday 4:00 — 5:00pm.


Recommended Further Reading


Homework  will be assigned every week except when an exam is scheduled the following week. A set of solutions will be made available. You are encouraged to work on the assignments in small groups.

Two Exams  will be given: one midterm exam and a comprehensive final exam. All exams are conducted under the rules and regulations of the Honor Code (see University Catalog).

On-line Class Material  Class material will be distributed electronically via the WorldWide Web. Use a browser to find the ECE 630 homepage at URL http://www.spec.gmu.edu/~pparis/classes/ece630.html.

I will also correspond with you through your Mason e-mail account — check your e-mail regularly. The BlackBoard page for this course will contain homework assignments, syllabus, and your grades.
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>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>30%</td>
</tr>
<tr>
<td>Midterm</td>
<td>35%</td>
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<tr>
<td>Final</td>
<td>35%</td>
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Tentative Course Schedule

Background Material

- **Week 1:** Introduction and Overview
- **Week 2:** Random variables with emphasis on the Gaussian distribution
- **Week 3:** Random processes.
- **Week 4:** Signal space concepts.

Optimal Receiver in White Gaussian Noise

- **Week 5:** Binary hypothesis testing
- **Week 6:** The matched filter.
- **Week 7:** $M$-ary signal sets and the union bound.
- **Week 8:** Midterm Exam.
- **Week 9:** Message sequences.

Digital Modulation

- **Week 10:** Complex baseband representation of signals and random processes.
- **Week 11:** Linear, digital modulation methods and their bandwidth.
- **Week 12:** Orthogonal, bi-orthogonal, and differential modulation.

Advanced Topics: The final two weeks of the class will consider advanced topics, options include:

- Introduction to error correction coding.
- Dispersive channels and equalization.
- Fading channels and diversity.
- OFDM

Final Exam: May 15, 4:30–7:15pm