Statistical Communication Theory

ECE 630

Spring 2017

Instructor  Dr. B.-Peter Paris
Nguyen Engineering Building Room 3803
Tel.: (703) 993–1559
e-mail: pparis@gmu.edu
WWW: http://www.spec.gmu.edu/~pparis

Time and Place  Thursday 7:20pm — 10:00pm, Innovation Hall, Room 330

Office Hours  Thursday 5:30pm — 6:30pm and Tuesday 3:00 — 4:00pm.


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 World-Wide 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>
</tr>
<tr>
<td>Final</td>
<td>35%</td>
</tr>
</tbody>
</table>

Tentative Course Schedule

Background Material

Week 1: Random variables with emphasis on the Gaussian distribution
Week 2: Random processes.
Week 3: Signal space concepts.

Optimal Receiver in White Gaussian Noise

Week 4: Binary hypothesis testing
Week 5: The matched filter.
Week 6: M-ary signal sets and the union bound.
Week 7: Midterm Exam.
Week 8: Message sequences.

Digital Modulation

Week 9: Complex baseband representation of signals and random processes.
Week 10: Linear, digital modulation methods and their bandwidth.
Week 11: Orthogonal, bi-orthogonal, and differential modulation.

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

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

Final Exam: May 11, 7:30–10:15pm