Communication and Information Theory

ECE 460

Fall 2015

Instructor  Dr. B.-Peter Paris
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Time and Place  Monday and Wednesday, 3:00pm-4:15pm, Enterprise Hall, room 178.

Office Hours  Tuesdays 2:00-3:00pm and Wednesdays 11:00am-noon. or by appointment.

Course Goals  This course introduces students to key concepts in the design and analysis of modern communications systems. Throughout, theory is illustrated by examples from wireless communication systems. Students will learn how modulation is used to shift signals to radio carrier frequencies and back; this forms the basis of analog modulation. Students will understand how digital information is transmitted in modern communication systems. Students will learn how to recover this digital information from a received signal.


Recommended Further Reading


Homework  will be assigned every week and is due the following week.

You are encouraged to work on the assignments in small groups. Do not refer to existing homework solutions; this constitutes plagiarism and will be handled in accordance with the Honor Code. Homework solutions will be made available. Homework will be collected and graded by the teaching assistant.

Multiple Quizzes, one Midterm Exam and a Final Exam  will be given during the semester. Quizzes will not be announced and may be given at any time during the class. Make-up exams are rarely given. In case of an emergency, contact the instructor as soon as possible and always before the exam. Failure to take an exam, will result in no credit for the exam. All exams are conducted under the rules and regulations of the Honor Code (see University Catalog).
Teaching Assistant  Yuqi Wang
Email: ywang39@gmu.edu

On-line Class Material  Class material will be distributed electronically via the World-Wide Web. Use a browser to find the ECE 460 homepage at URL: http://www.spec.gmu.edu/~pparis/classes/ece460.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 by a weighted average of homework, the two exams, and the final exam in the following manner:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Quizzes</td>
<td>20%</td>
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<tr>
<td>Exam 1</td>
<td>20%</td>
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<tr>
<td>Final</td>
<td>40%</td>
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</tbody>
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Tentative Course Schedule

Part I: Signals & System and Analog Signal Transmission and Reception
Book Chapters: 2 and 3.

- **Week 1**  Signals and Systems Foundations for Communications
- **Week 2**  Signals and Systems Foundations for Communications (cont’d)
- **Week 3**  Baseband equivalent signals
- **Week 4**  Analog Modulation techniques.
- **Week 5**  Analog Modulation techniques (cont.)
- **Week 6**  Midterm Exam (1.5 hrs).

Part II: Probability Review and Digital Signal Transmission and Reception
Book Chapters: 4, 5, and 6.

- **Week 7**  Digital Modulation Concepts
- **Week 8**  Digital Modulation Concepts - signal spaces
- **Week 9**  Just enough on Random Processes
- **Week 11**  Performance of Digital Receivers.
- **Week 12**  Performance of Digital Receivers (cont.).
- **Week 13**  Advanced Topics: Synchronization
- **Week 14**  Putting it all together

Monday Dec. 14  Final Exam (1:30pm – 4:15pm).