Introduction to Data Communication Networks  
EE 424/504  Spring 2010

Class Info:  Meeting time:  12:45-2:05 Tuesday and Thursday  
Location:  Engineering Building 135

Instructor:  Laurie Joiner  
Email:  ljoiner@eng.uah.edu  
Office:  EB 217-B  
Phone:  824-6126

Office Hours:  Tuesday and Thursday 10:00-11:00, Wednesday 2:00-3:00

Prerequisites:  EE 383 Analytical Methods for Multivariable and Discrete Time Systems or  
CPE 381 Fundamental Signals and Systems for Computer Engineers

Required Text:  B.P. Lathi and Z. Ding, Modern Digital and Analog Communication Systems, 4ed,  

References:  B. Sklar, Digital Communications, 2ed. Prentice Hall, 2001  
R. Ziemer and R. Peterson, Introduction to Digital Communication, 2ed, Prentice Hall,  
H. Stern and S. Mahmoud, Communication Systems Analysis and Design, Prentice Hall,  
2004.

Objectives:  By the end of the semester you should be able to:  
• Define and describe various digital modulation techniques  
• Design optimal receivers and develop error performance equations for FSK, PSK,  
  and QAM  
• Define and describe pulse code modulation  
• Define multiplexing and understand its use in the T1 digital carrier system  
• Describe the operation and basic functions of a standard telephone set.  
• Describe the transmission characteristics of a local subscriber loop  
• Describe the basic operation of a cellular telephone system  
• Describe the error-correction mechanisms of FEC, ARQ, and Hamming codes

Topics covered:  Introduction  
  Digital communication system  
  Frequency domain analysis  
  Bandwidth  
  Autocorrelation  
  Analog-to-Digital Conversion  
  Sampling and Quantization  
  PCM  
  Multiplexing  
  Digital Data Transmission  
  Line coding  
  Pulse shaping  
  Modulation techniques  
  Introduction to Probability Theory  
  Performance of Digital Communication Systems  
  Spread spectrum communications  
  Direct sequence  
  Frequency hop  
  Digital T-Carriers and Multiplexing  
  Time-division multiplexing  
  T1 digital carrier  
  Frequency-division multiplexing  
  Public Telephone Network
Local subscriber loop
Transmission impairments
Cellular Telephone Concepts
Cells and frequency reuse
PCS, N-AMPS, GSM
Error Control and Error Correction

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Quizzes</td>
<td>10%</td>
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<tr>
<td>Two in-class tests</td>
<td>25%</td>
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<td>Final exam</td>
<td>30%</td>
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Final average of:  
- 90 – 100  A
- 80-89  B
- 70-79  C
- 60-69  D
- < 60  F

Graduate level: You will be asked to write a short report on a subject related to data communications. You will present your report to the class in a conference style format (approximately 20 minute presentation). You will be graded on your report and presentation. This will be 25% of your homework grade.

Academic Honesty: All work submitted for the tests and final must be your own unaided work. Collaboration on homework and laboratories is permitted, but solutions must be your own. Anything in the written project not in your own words must be properly quoted and cited.

Web Site: A web site for this course will be maintained at http://www.ece.uah.edu/~ljoiner/ee424. Any course handouts and all homework assignments will be posted to this page.

Final Exam: The final exam is on Thursday, April 29 from 11:30 am-2:00 pm.