



WRIGHT STATE
UNIVERSITY

Electrical Engineering
311 Russ Engineering Center
Wright State University
3640 Colonel Glenn Highway
Dayton, Ohio 45435-0001

EE 322/522

Linear Systems

Spring 2008

Text: Lathi, B. P. *Signal Processing and Linear Systems*, 1998, Oxford University Press
Recommended: A. Oppenheim, A. Willsky with H. Nawab, *Signals and Systems*, Prentice Hall, 1997.

Time: TH 12:20 PM - 2:00 PM (Oleman 306)

Facilitator: Erik Blasch, PhD, MBA, 904-9077, erik.blasch@wpafb.af.mil;
If email : Put **EE322** in the Header

Class Website: Class related material such as class notes, homework, and exam solutions will be posted at
<http://www.cs.wright.edu/~eblasch>

Course Description:

This course will expound on the signals and systems from a mathematical viewpoint and investigate their properties in the time domain (time response, convolution, etc.) as well as in the frequency domain (Fourier Analysis). Both continuous and discrete signals and systems will be investigated.

Office Hours: By appointment.

Grading: (tentative)

Homework	30% (teams of 3, with MATLAB)
Midterm 1	20% (Ch05, Ch08, Ch09) (with MATALB)
Midterm 2	20% (Ch09, Ch10, Ch11) (with MATLAB)
Final	30% (Ch07, Ch12, and comprehensive) [MATLAB?]

In addition, your participation in class may influence the final course grade through a subjective evaluation of your participation and quality of effort. For example, failure to submit homeworks would demonstrate lack of effort.

Grading Scheme

A: 85+, B 75+ , C 65+, D 50+, F < 50

Exams: Exams are closed-book, closed-notes, except for a single self-prepared summary sheet. There will be a take-home MATLAB portion of the exam.

Quizzes: No Quizzes

Homework: All homework will be graded, but no partial credit will be given (correct 10/10, tried 5/10). You are strongly encouraged to work all of the assigned homework problems since exam questions will be similar to assigned homework problems. Homework due on time.

Schedule: (tentative) The following chapters will be covered during the quarter in the following order: 5, 8, 9, 10, 11, 7, 12.

Miscellaneous: You are responsible for all assignments, changes of assignments, and other course-related events which occur in class.

Note: Students are expected to come to class prepared, participate in discussions to clarify understanding, and perform all requested work. Homework is due at the beginning of class and MATLAB emailed to professor. If you have medical needs, please inform the professor so accommodations can be made.

Outline: Homework

Chapter 1: Introduction to Signals and Systems	Week 01
Chapter 5: Sampling Problems: 5.1-2 M , 5.1-3, 5.2-1	Week 01 Due Week 02
Chapter 8: Discrete-Time Signals and Systems Problems: 8.2-2 M , 8.2-4, 8.2-9, 8.3-2, 8.3-3, 8.4-1 M , 8.4-3 M , 8.5-1, 8.5-4	Week 02 Due Week 03
Chapter 9: Time-Domain Signals and Systems Problems: 9.1-1, 9.1-5, 9.2-2, 9.3-4, 9.4-3,	Week 03 Due Week 04
Midterm	During Week 04/05
Chapter 9: Time-Domain Signals and Systems Problems: 9.1-5 M , 9.4-5, 9.4-14 M , 9.5-4, 9.6-1 M	Week 04 Due Week 05
Chapter 10: Fourier Analysis of Discrete-Time Signals Problems: 10.1-1 M , 10.1-6, 10.2-3, 10.3-1, 10.4-1 M , 10.5-2, 10.6-5, 10.6-8, 10.6-9 M	Week 05/06 Due Week 06
Chapter 11: Discrete-Time System Analysis using the Z-Transform Problems: 11.1-2, 11.1-3, 11.2-2, 11.3-5, 11.3-14, 11.4-1, 11.6-2	Week 07/08 Due Week 07
Midterm	During Week 08
Chapter 11: Discrete-Time System Analysis using the Z-Transform Problems: 11.2-2 M , 11.3-14 M , 11.7-1 M , 11.7-3	Week 08 Due Week 09
Chapter 7: Frequency Response and Analog Filters Problems: 7.2-2 M , 7.4-1, 7.5-2, 7.7-3 M	Week 09 Due Week 10
Chapter 12: Frequency Response and Digital Filters Problems: 12.2-1 M , 12.5-2, 12.6-7, 12.7-2 M ,	Week 10 Due Week 10
Final	

Philosophy: (1) Remember – **you learn by doing** and while the course is fundamental to most engineering studies programs, the professor can only facilitate your learning, but you must practice to learn. Lectures will overview the material, homework/tests will reinforce concepts, and MATLAB will foster understanding. (2) Cheating and lack of effort will result in non-passing grades → The “no free lunch” theorem.

Perspective: EE322/522 is about the DTFT and solutions using the Z-transform that lead toward filter design. While your knowledge is important for “understanding”, the true nature of your knowledge will be in implementation or “design” (e.g. MATLAB). Having the experience with implementation will reinforce understanding. With future employment, you will not be asked to solve a DTFT, but rather to implement a DTFT.

Other References:

E. W. Kamen & B. S. Heck, Fundamentals of Signals and Systems Using the Web and Matlab, Prentice Hall, 2000.

<http://users.ece.gatech.edu/~bonnie/book/>

J. R. Buck, M. M. Daniel, A. C. Singer, *Computer Explorations in Signals and Systems Using MATLAB*, Prentice Hall, 2002.

Shaums Outline: *Signals and Systems*, H. Hsu, 1995.

See Homepage : <http://www.cs.wright.edu/~eblasch>

For additional DEMOS: <http://users.ece.gatech.edu/mcclella/matlabGUIs/>

[Z Domain, CLTI, DLTI, Fourier Series]

In the field of experimentation, chance favors only the prepared mind. – Louis Pasteur, 1854