The Pennsylvania State University
Electrical Engineering
EE317 Signals and Systems
Spring Semester 2004

Objective: Students will effectively learn essential analysis techniques in continuous– and discrete–time systems to prepare for advanced courses in a broad range of areas including control systems, communications, signal processing, and image processing.

Prerequisites: EE210, Math 250, CMPSC 201.

Instructor: Muhittin Yilmaz (muhittin@psu.edu)
Office Hours: M.T. 11:30-12:30 PM, 227 EE East, 865-7183 or by appointment.

TA: Luther Davis (led149@psu.edu)
Recitation: Thursday, 7:30-9:00PM, primarily to explain homework problems.

Schedule: Lectures on M.W.F, 10:10-11:00 AM, in 127 Sackett.
Lectures will roughly follow the order of textbook topics and the lecture notes will be posted on the web. However, reading the text-notes is **not** a substitute for coming to lectures, since the lectures will cover some topics that are not in the text, and will cover others in an innovative fashion relative to the text. Students who miss any lecture are responsible for obtaining notes from a classmate.

Homework: Homework sets will be assigned on each wednesday on the webpage and be due next wednesday by 4:00PM to the homework slot on the EE main office. I plan to assign between 4-7 problems in each homework set that may have different point values. Late homework solutions **will NOT** be accepted. Students are encouraged to work in groups to discuss the general principles involved in solving the problems. However, you must submit your own work. **Copying or sharing solutions will definitely result in zero credits for the homework set in question and a report to the academic department**. For Matlab simulations, you can use the PC Lab, which is located in 304 EE West. All relevant Matlab outputs(M-files, figures, results etc.) must be attached to the solution set to get full credit. Homework solutions will be posted on the web shortly after due dates.

Exams: There will be two midterms and a final for the class. All exams will be closed book, closed notes, however, one page cheat sheet(8 1/2 by 11) will be allowed. Only the final will be a comprehensive exam. Conflict exams will be given in accordance with the university policies 44-35 and 44-25. Other make-up exams will be granted at the instructor's discretion.

Grading Policy:

Homework	20%	
Evening Exam-I	25%	Tuesday, February 24, 2004, Time and place TBA.
Evening Exam-II	25%	Tuesday, April 6, 2004, Time and place TBA..
Final	30%	During the finals week.

Textbook: *Signals, Systems and Transforms*, by Charles L.Phillips and John M.Parr, Eve A.Riskin, Third edition, Prentice Hall, 2003. Many homework problems will be given directly from the textbook.

Web Page: All necessary papers and announcements are planned to be given on the course home page at http://labs.ee.psu.edu/courses/ee317 .

Topics:

1.**Introduction** (Chapters 1 and D)
(a) Motivation
(b) Review of Complex Numbers
2.**Signal Representation** (Chapters 1 and 2)
(a) Continuous-Time(CT) vs. Discrete-Time(DT) Signals
(b) Periodic and Non-periodic Signals
(c) Transformations of the Independent Variable
(d) Fundemental Signals
3.**Continuous-time Systems** (Chapters 2 and 3)
(a) Classification of Continuous-Time Systems
(b) Linear Time-Invariant(LTI) Systems
(c) Continuous-Time Convolution
(d) Properties of LTI Systems
4.**Fourier Analysis of Continuous-Time Systems** (Chapters 4 and 5)
(a) Fourier Series
(b) Continuous-Time Fourier Transform
(c) Applications of the Fourier Transform:Filtering and Modulation

5.**Sampling and Reconstruction**
(a) The Sampling Theorem
(b) Effect of Undersampling–Aliasing
(c) Reconstruction of a Signal-Interpolation– Zero-Order Hold

6.**Discrete-Time Signals and Systems** (Chapters 9 and 10)
(a) Discrete-Time Signals
(b) Discrete-Time Systems
(c) Linear Time-Invariant(LTI) Systems
(d) Discrete-Time Convolution
(e) Difference Equation Representation
(f) Implementation of Discrete-Time Systems
7.**The Z-Transform** (Chapter 11)
(a) Definitions and Examples
(b) Region of Convergence
(c) Properties of z-transform
(d) Inverse z-transform
8.**Fourier analysis of Discrete-Time Systems** (Chapter 12)
(a) Discrete-Time Fourier Transform(DTFT)
(b) Properties of DTFT
(c) Computer Approximation of DTFT: Discrete-Fourier Transform(DFT)