EE 120: Signals and Systems

University of California, Berkeley — Spring 2018

Instructor: Thomas Courtade

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Teaching Assistant: Hang Su and Philippe Laban

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Lecture: Monday, Wednesday 2:00-4:00pm, Evans 60

Recitation Sections: Monday 4:00-5:00pm, 289 Cory
Wednesday 1:00-2:00pm, Dwinelle 183
Friday 12:00-1:00pm, Dwinelle 182

Office Hours: See bCourses front page for up to date information

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Note: This document is intended as an overview of the course, logistics and policies. Please monitor bCourses for the most up to date information.

Course Overview

Signals convey information. Systems transform signals. This course explores the mathematical models used to design and understand both. It is intended for students interested in developing a deep understanding of how to digitally create and manipulate signals to measure and control the physical world and to enhance human experience and communication. The focus is on different representations of signals and systems to aid analysis and design. Concepts will be illustrated by examples from signal processing, communication and control.

This course will reinforce and build upon the material you've seen in EE16A/B. It will further develop your understanding of the interplay between signals and systems, and provide you with the prerequisite material for other 120-series courses and related careers.

Catalog Description: Continuous and discrete-time transform analysis techniques with illustrative applications. Linear and time-invariant systems, transfer functions. Fourier series, Fourier transform, Laplace and Z-transforms. Sampling and reconstruction. Solution of differential and difference equations using transforms. Frequency response, Bode plots, stability analysis. Illustrated by analysis of communication systems and feedback control systems.

Course Logistics

This class consists of lecture and discussion components. Lecture will focus on concepts, and discussion will emphasize examples and applications through problem solving. You should attend both.

Exams: There are two in-class midterms scheduled for Wednesday, February 28 and Wednesday, April 11. The final exam is scheduled for Tuesday, May 8 from 11:30am-2:30pm. There are no makeup exams.

Prerequisite: EE16A/B or EE20 or instructor consent.

Evaluation: The course grade will be broken down roughly as follows: Homework (15%), Midterms (25% each), Final Exam (35%).

Text: Lectures, for the most part, follow the course textbook below. You should plan to read it to supplement lecture material.

- *Signals and Systems* 2e, by A.V. Oppenheim and A.S. Willsky. I've placed this on course reserve at the engineering library.

Course Outline:

- Linear time-invariant systems, Fourier transforms, and applications to signal processing
- Sampling of continuous-time signals, upsampling and downsampling of discrete-time signals
- System analysis using Laplace and z-Transforms
- Engineering applications: Communications, control systems and statistical signal processing

Course Policies

- Homework: Weekly homework will be assigned and is due on the specified due date. No late homework will be accepted, but your two lowest scores will be dropped from the overall grade computation to allow for unforeseen circumstances. Clearly label each page of your homework with your name and assignment number.
- Regrade Requests: Regrading of homeworks or exams will only be undertaken in cases where you believe there has been a genuine error or misunderstanding. Bear in mind that our primary aim in grading is consistency, so that all students are treated the same; for this reason, we will not adjust the score of one student on an issue of partial credit unless the score allocated clearly deviates from the grading policy we adopted for that problem. If you wish to request a regrading of a homework or exam, you must return it to your section TA with a written note on a separate piece of paper explaining the problem. The entire assignment may be regraded, so be sure to check the solutions to confirm that your overall score will go up after regrading. All such requests must be received within one week from the date on which the homework or exam was made available for return.
- Collaboration: You are encouraged to discuss homework problems with your classmates. However, you must always write up the solutions on your own, and you must never copy the solutions of other students. Similarly, you may use books or online resources to help solve homework problems, but *you must always credit all such sources in your writeup and you must never copy material verbatim*. You are reminded of the Department's Policy on Academic Dishonesty.