Instructor

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Prerequisites

This course presumes a solid understanding of LTI systems, discrete-time signals, sampling, Fourier transforms and bilateral Laplace transforms and $z$-transforms for both deterministic and stochastic signals as in ECE 310 and ECE 313. If you have not already taken these classes (or equivalents) and have any doubts of your understanding of these concepts please see me. The first few lectures of the semester will quickly review some of these topics, but at an aggressive pace meant to establish notation and serve as a reminder for those already familiar with the topics covered. It is important to understand clearly that this is a graduate subject. Consequently, in addition to the formal prerequisites, we assume you have an interest in and commitment to understanding concepts in depth. As a graduate subject, your responsibilities may involve seeking out materials outside the course notes for additional reference.

Text and References

The text for this course is a set of course notes, prepared by Prof. Singer and Prof. Moulin, which can be purchased from the TIS copy store. A second set of course notes prepared by
Prof. Jones can also be purchased from TIS. It is recommended that you purchase both of these sets of notes.

You may find the following books helpful. They are on reserve in the Grainger Library.


Also, some of you may find the following matlab exercise books to be useful references, although we will not use them directly in any way


In addition to providing opportunities for hands-on practice with the ideas and concepts developed in class, these book contain a variety of matlab tips that may be useful to you in the undertaking the class projects (described later in this handout).

**Lectures**

Lectures: Mondays, Wednesdays, and Fridays 11:00am - Noon, 161 Everitt Laboratory.

**Office Hours**

The staff is very available during office hours and you are encouraged to come by during the times indicated. While in an emergency the TA might be willing to briefly meet with you outside of office hours, you must remember she is also taking courses, writing her thesis, etc.

The office hours for Prof. Singer are unplanned and unstructured discussions of any aspects of the material that those attending would like to discuss. You do not need to come with questions and the larger the group, the more fun and interesting it is likely to be. When required, individual appointments can be scheduled separately.
Homework

There will be approximately 10 problem sets, corresponding to a quasi-weekly schedule. Don’t be misled by the relatively few points assigned to homework grades in the final grade calculation. While the grade you get on your homework is only a minor component of your final grade, working the problems is a crucial part of the learning process and will invariably have a major impact on your understanding of the material (and, in turn, your quiz performances and final grade!).

From this perspective, course “bibles” from previous terms are self-defeating and expressly forbidden. However, moderate collaboration in the form of joint problem solving with one or two classmates is permitted and even encouraged provided your write-up is your own. In making up the quizzes, it will be assumed that you have worked all the assigned problems. As an extra incentive, typically one problem on each quiz will be strongly based on one of these problems.

Problem sets will typically be due on Fridays and must be handed in by the end of the class in which they are due. Solutions will be posted on the web page by the following day. Each problem set that you turn in will be given a score of G, R or U. A score of G is given for a good effort on all or most of the problems (even if not with uniform success); R is for a reasonable attempt, but with significant gaps; and U would be for an unsatisfactory effort, or when there is little evidence of any original thought or effort. For additional feedback, come to any of the staff’s office hours after you’ve had a chance to look through the solutions.

Quizzes

There will be two quizzes and a final exam during the semester. Tentative dates for these are:

   Quiz 1  Thursday, October 5, 7-9pm
   Quiz 2  Thursday, November 9, 7-9pm
   FINAL  Thursday, December 14, 7-10pm, 161EL

The quizzes will be closed book. However, you will be allowed to bring one 8.5 × 11-inch sheet of notes (both sides) to Quiz 1, two 8.5 × 11-inch sheets of notes (all four sides) to Quiz 2, and three to the final exam. This is a total of 3 (three) sheets, if you want to bring your sheet from Q1 to Q2, then you have only one additional sheet for Q2. Similarly, if you want to bring your sheets from Q2 to the final, then you have only one additional sheet for the final.

Matlab-Based Project

One of the best ways of learning much of the material in this course is by exploring many of the concepts with the computer. In addition to homework problems and quizzes, this
subject will have a computer laboratory component based on the Matlab software package. Matlab is widely used in academic and industrial research laboratories in general, and is well-suited for work in signal processing in particular. Many of you have probably had some experience with Matlab in undergraduate courses. For those of you who haven’t, though, you’ll find that among the many attractive features of Matlab are its ease of use and very short learning curve.

There will be one Matlab-based project during the term. The details and timetable of the project will be announced shortly. Please note: completing the project and write-up is a requirement of the course and not optional—i.e., to receive a passing grade in the course you must complete the project and write-up!

For those of you who might benefit from some initial familiarization with Matlab tools in anticipation of the projects, you might find attempting some of the exercises in the two Matlab-based exercise books useful (see Text and References section).

**Course Grade**

The final grade in the course is based on our best assessment of your understanding of the material and participation during the semester. The quizzes, problem sets, and matlab project are combined with the following weighting to arrive at the final grade:

- Quizzes 1 & 2: \( 50\% \)
- Final Exam: \( 35\% \)
- Matlab Project and Problem Sets: \( 15\% \)