EE 278: Introduction to Statistical Signal Processing
Autumn 2018-2019
Course Information

Instructor
Balaji Prabhakar
Email: balaji@stanford.edu
Office hours: Tuesday 1:30-3:00 PM
Packard 269

Course Assistant
Ahmad Ghalayini
Email: ghalayini@stanford.edu
Office hours: Thursday 10:00-11:30 PM
Packard 106

General Information
Course: EE 278, Introduction to Statistical Signal Processing
Lectures: Tuesdays & Thursdays, 12:00pm–1:20pm, Thorton 102
Units: 3 units
Website: https://web.stanford.edu/class/ee278/
Check the website for updated information regarding office hours, homework, exams, etc. Major announcements will be emailed. Office hours are intended to be a time for discussion about general class topics, homework, and review exercises.

Review Sessions
There will be a weekly review session, starting from the second week of the quarter.
Time: Tuesdays 4:30 PM-5:20 PM
Location: Huang 018

Course Description
Review of basic probability and random variables. Random vectors and processes; convergence and limit theorems; IID, independent increment, Markov, and Gaussian random processes; stationary random processes; autocorrelation and power spectral density; mean square error estimation, detection, and linear estimation.

Prerequisites
EE178 or equivalent, linear systems and Fourier transforms at the level of EE102A.B or EE261, basic linear algebra, and familiarity with a language like MATLAB or Python to do some simulation exercises.

Recommended Texts
We will be using lecture notes posted online as our base reference for the course’s material. However, the following books may be useful as additional reading and should be on reserve at the Engineering Library:

- Leon-Garcia, Probability and Random Processes for Electrical Engineers.
- Papoulis, Probability, Random Variables and Stochastic Processes.

The following resources are also available online:
- B. Hajek, An Exploration of Random Processes for Engineers http://www.ifp.illinois.edu/~hajek/Papers/randomprocJuly14.pdf
Course Requirements and Grading
Homework: There will be weekly homework sets.
Midterm: There will be a midterm exam approximately halfway through the quarter.
Final: There will be a final exam at the end of the quarter.
Grading guideline: 20% Homework, 35% Midterm, 45% Final

Homework Submission
Homework will be made available on Thursdays after class and will be due the following Thursday by 11:59pm sharp, unless otherwise stated. All students (on-campus and SCPD) should submit their homework electronically by uploading it through Gradescope. No late homework is accepted, but the lowest scoring homework will be dropped.

Piazza
The main mode of electronic communication between students and staff, as well as amongst students, will be through Piazza. It is intended for general questions about the course, clarifications about assignments, student questions to each other, discussions about material, and so on. We strongly encourage students to participate in discussion, ask and answer questions through this site.

Collaboration
You are encouraged to work on homework problems in study groups; however, you must always write up the solutions on your own, and you must never read or 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 (see Honor Code).

Course Outline
The following topics will be covered in the course:
1. Review of basic probability and random variables
2. Random vectors and processes
3. Convergence and limit theorems
4. IID, independent increment, Markov, and Gaussian random processes
5. Stationary random processes
6. Autocorrelation and power spectral density
7. Mean square error estimation, detection, and linear estimation.