

ECE 541: Stochastic Signals and Systems – Fall 2017

Lectures — Th 3:20 - 6:40 PM, ARC-204

Instructor

Waheed U. Bajwa
723 CoRE, Tel. 848-445-8541

Means of Communication

Piazza (Class Link): <http://bit.ly/2e1GvQ0> (**all non-personal questions**)
E-Mail: waheed.bajwa@rutgers.edu (**personal questions**)
Twitter: @SigProcessing (#RUECE541) (**light discussions**)
Sakai: <http://bit.ly/2e1OxIG> (**course management**)

Please sign-up for Piazza using the following link: <http://bit.ly/2vMqp8r>

Office Hours

By *appointment* on Wednesday evenings 5-6 PM.
An appointment must be made by Wednesday morning 11 AM at the latest.

Recommended Texts

J.A. Gubner
Probability and Random Processes for Electrical and Computer Engineers
Cambridge University Press (ISBN-13: 978-0521864701)

R.D. Yates and D.J. Goodman
Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers
John Wiley and Sons (3rd Edition, 2014)
Companion Website: <http://bit.ly/2grnIaj>

Optional Text

A. Papoulis and S.U. Pillai
Probability, Random Variables and Stochastic Processes
McGraw-Hill (4th Edition, 2002)

Prerequisites

Enrolled students must have taken undergraduate courses in probability theory and linear systems. The course will also require some basic knowledge of linear algebra. Students are also expected to be comfortable with the use of Jupyter (recommended), IPython (acceptable) or MATLAB (least acceptable) for assignments/projects.

Course Policies

The final course grade will be based upon:

1. Quizzes (10%)
2. Homework (5%)
3. Term Project (10%)
4. Midterm exam (30%)
5. Final exam (45%)

Late homework submission policy: Every student gets a grace period of up to 3 days for a maximum of two homeworks. Utilization of the first grace period is without any penalty. Utilization of the second grace period comes with a 30% penalty. No late submissions will be accepted from a student who has utilized both these grace periods.

Quiz makeup policy: As a general policy, no makeups will be permitted for the quizzes. However, rules are meant to be broken :), so feel free to bring up any special circumstances to my knowledge and I will be happy to review the makeup requests on a case-by-case basis.

Exam policy: Exams will be closed book and closed notes. Students can bring in two, two-sided letter-sized pages for the midterm exam and four, two-sided letter-sized pages for the final exam. As a general policy, there will be no makeup exams. I will allow exceptions for rare emergency situations, but this would require at least 7 days advance approval to skip an exam. Any one not appearing in an exam without such prior approval will automatically get a 0.

Grading policy: Grades will be assigned on a relative basis. The relative scale though will vary based upon the performance of the overall class. In an ideal setting, students above class average will get B+ and higher and students at or below class average will get B and lower, respectively. If the class performs really well, however, then the B+ will turn into an A. Similarly, if the class performs really bad then the B+ will turn into a B (or even C+).

Academic misconduct and plagiarism warning

It is important that the students enrolled in this class familiarize themselves with the Rutgers Academic Integrity Policy, <http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers>, and the definition of plagiarism (<http://www.plagiarism.org/plagiarism-101/what-is-plagiarism/>). All cases of academic misconduct, whether minor or major, will not only be reported to the School of Engineering, but will, in most cases, also result in loss of one or more grade points.

Tentative Course Outline

- Weeks 1–5: Review of mostly undergraduate-level probability with some newer topics in between. Using J. Gubner's book as a reference, we will likely cover Chapters 1–5 and Chapter 7 during this period.
- Weeks 6–8: We will discuss random vectors and Gaussian random vectors (JG's Book: Chapters 8 and 9) during this period. Midterm exam will also take place during this period.
- Weeks 9–10: We will discuss random processes and concepts such as wide-sense stationarity (JG's Book: Topics from Chapter 10).
- Week 11: We will cover advanced random processes such as the Poisson process (JG's Book: Topics from Chapter 11).
- Weeks 12–13: We will cover discrete Markov chains (JG's Book: Topics from Chapter 12).
- Week 14: We will discuss different modes of convergence in probability theory (JG's Book: Topics from Chapters 13 and 14).

Some tips for making learning the class material easier

Here are some tips that I hope you will remember to ensure you have a good learning experience throughout the class.

- If you feel lost during the class, please reach out to me. You will be surprised to know that I do not turn into a monster during office hours :) .
- Because of the mathematically intensive nature of the course, one cannot learn it by forgetting about it till it is time for an exam. It is therefore important that you try to keep up with the class material on a regular basis.
- Class lectures are not enough to learn everything about the course. Reading material and sample problems (ungraded) will be assigned on a regular basis to help you learn all the important aspects of the course. Please make sure you keep up with these things, which will be communicated via email and via the course website.
- While the percentage of the grade assigned to quizzes and homeworks is small, these two categories are going to teach you the most and ensure that you do well on the exams. The purpose of keeping the percentage small is that you don't feel pressured to blindly cheat from other students. You are encouraged to discuss things with others, but you will be doing yourself a big favor by doing the homeworks and quizzes in the end by yourself.