ECE 511 Analysis of Random Signals
Syllabus
IIT, Fall 2016

Instructor: Salim El Rouayheb, Email: salim@iit.edu

Course Description: Probability theory, including discrete and continuous random variables, functions and transformations of random variables. Random processes, including correlation and spectral analysis, the Gaussian process and the response of linear systems to random processes.

Place & Time: M/W 3:15-4:30PM, at WH-115

Office Hours: M/W 4:45-5:45PM, at SH-319, or email for appointment

Textbook: H. Stark and J. W. Woods, *Probability, Statistics, and Random Processes for Engineers*, Prentice Hall; 4 edition (August 20, 2011).

TA: Lu Liu, Email: lliu41@hawk.iit.edu

TA Office Hours: M/W 2:00-3:00PM, at SH-307B, or email for appointment

Piazza: I will be using Piazza for posting class announcements, homework assignments and class discussions. Rather than emailing me questions, I strongly encourage you to post your questions on Piazza, where you can get help fast and efficiently from your classmates and myself. Find our class page at: https://piazza.com/iit/fall2016/ece511/home.

Course Webpage: http://www.ece.iit.edu/∼salim/ECE511Fall2016.html.
I will mainly be using Piazza for posting homework assignments and course announcements. Blackboard will be used for communicating grades and submitting homework solutions.

Grading: The grade for the class will be based upon homework, two exams and a final exam. The date of the two exams will be announced in class at least two weeks in advance.

- Homework: (10%) There will be regular homework assignments. Students will have roughly 1 week to solve each homework set (the due date will be provided on the assignment).
- Exams: (2 at 30% each) Two exams will be given. For each exam, at least one week notice will be given in class to allow students to prepare.
- Final Exam: (30%) There will be a final exam.

References:

- G. Grimmett and D. R. Stirzaker, *Probability and Random Processes*, Oxford Uni. Press.

- G. Grimmett and D. R. Stirzaker, *One Thousand Exercises in Probability*, Oxford Uni. Press.
- A. Papoulis and S. U. Pillai, *Probability, Random Variables, and Stochastic Processes*, McGraw-Hill, Fourth or latest Edition.

Additional online references:

- R. G. Gallager, *Stochastic Processes: Theory for Applications.*
  (Video lectures available on Youtube).
- B. Hajek, *An Exploration of Random Processes for Engineers*
- R.M. Gray and L.D. Davisson, *Introduction to Statistical Signal Processing*

Topics:

1. Introduction to probability
2. Random variables
3. Functions of random variables
4. Expectation and moments
5. Random vectors
6. Random sequences
7. Random processes
8. Random walks, large deviations, martingales

Important Information:

- Collaboration on the homework is permitted. However, each student must write his own solutions and mention the names of his collaborators.
- Collaboration on the exams is NOT permitted. Any behavior on any exam that could be considered copying or cheating will result in an immediate zero on the exam for all parties involved, failure in the class, and notification of the Dean's Office.
- Homework is due at the beginning of lecture on the due date. Late homework gets a zero grade. The only exceptions are for documented accidents, illnesses, or deaths in the family.
- If you are ill on the date of an examination, or if you must be away, please notify the professor BEFORE the examination, if possible, or at least as EARLY as possible. Medical or employer interview slips for absences from the examination are required if you were ill or unavoidably absent.
- Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources. The Center for Disability Resources (CDR) is located at 3424 S. State Street - 1C3-2, 312 567.5744 or disabilities@iit.edu