

Course Information

Instructor: Professor Mark R. Bell

Course Location: FRNY B124, T,Th: 10:30–11:45am

Office: MSEE 336

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Course Home Page: <http://www.ece.purdue.edu/~mrb>

Off-Campus Office Hours: W: 2:00–3:00pm, Th: 2:00–3:00pm, or by appointment,

On-Campus Office Hours: T: 2:00–3:00pm, W: 3:00–4:00pm, or by appointment.

TA: TBD (To be determined)

Office: TBD

Phone: TBD

email: TBD

TA Office Hours: TBD

Text: A. Papoulis, *Probability, Random Variables, and Stochastic Processes*, 4th Edition, McGraw-Hill, 2002. (*The 3rd edition may also be used if you already have it.*)

Grading Policy: There will be three midterms exams worth 20% of the final grade each, and a final exam worth 40% of the final grade. Homework will be assigned approximately once a week, and solutions will be posted to the web after the suggested completion date, however homework will not be collected. There will be no make-up exams; if you miss a mid-term exam, your final exam score will be used in its place. If you are going to miss a midterm exam, you must tell me *before* the exam. Do not miss the final!

A Note on Homework: Although homework is not being collected, it is *essential* that you work through and understand the assigned homework problems. If you don't understand the homework problems, you may find the exams *very challenging*.

Additional References: The following books, while not required or necessary for the course, may be useful as additional references.

1. R. M. Gray and L. D. Davisson, *Introduction to Statistical Signal Processing*, Cambridge University Press, 2004. (A pdf copy of this book can be downloaded for free at <http://ee.stanford.edu/~gray/sp.html>)
 2. A. Leon-Garcia, *Probability and Random Processes for Electrical Engineers*, 2ed., New York, NY: Addison-Wesley 1989. (3ed. was published in 1994.)
 3. John J. Shynk, *Probability, Random Variables, and Random Processes: Theory and Signal Processing Applications*, Hoboken, NJ: Wiley, 2013.
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ECE600: Random Variables and Signals

Credit 3, Spring 2017

Core Course, CNSIP Area

Prerequisites: Graduate Standing and a solid understanding of Calculus and Fourier transforms. (An undergraduate course in probability is helpful, but not essential.)

Description: Fundamentals of probability and random processes as applied to engineering. Serves as a prerequisite to more advanced courses in communications, signal processing, control, and other areas of ECE using probabilistic modeling (*e.g.*, optics, fields, networks, *etc.*)

Text: A. Papoulis, *Probability, Random Variables, and Stochastic Processes*, Fourth Edition, McGraw-Hill, 2002.

Course Outline:

- random experiments
- probability spaces
- conditional probability
- statistical independence of events
- compound and repeated random experiments
- random variables
- probability distributions and density functions of random variables
- expectation
- characteristic functions and moment generating functions
- multiple random variables defined on a random experiment
- statistical independence of random variables
- correlation
- sequences of random variables and stochastic convergence
- the weak law of large numbers
- the central limit theorem
- stochastic processes
- stationarity
- correlation and covariance functions
- power spectral density
- Gaussian random processes through linear systems
- point and renewal processes
- the Poisson process
- Erlang n -th arrival time of a homogeneous Poisson process

ECE 600 Spring 2019 Schedule

Session No.	Date	Event
1	January 8, 2019	Lecture
2	January 10, 2019	Lecture
3	January 15, 2019	Lecture
4	January 17, 2019	Lecture
5	January 22, 2019	Lecture
6	January 24, 2019	Lecture
7	January 29, 2019	Lecture
8	January 31, 2019	Lecture
9	February 5, 2019	Exam 1
10	February 7, 2019	Lecture
11	February 12, 2019	Lecture
12	February 14, 2019	Lecture
13	February 19, 2019	Lecture
14	February 21, 2019	Lecture
15	February 26, 2019	Lecture
16	February 28, 2019	Lecture
17	March 5, 2019	Exam 2
18	March 7, 2019	Lecture
Spring Break	March 9–17, 2019	
19	March 19, 2019	Lecture
20	March 21, 2019	Lecture
21	March 26, 2019	Lecture
22	March 28, 2019	Lecture
23	April 2, 2019	Lecture
24	April 4, 2019	Lecture
25	April 9, 2019	Exam 3
26	April 11, 2019	Lecture
27	April 16, 2019	Lecture
28	April 18, 2019	Lecture
29	April 23, 2019	Lecture
30	April 25, 2019	Lecture