

ELEG 3143 – Probability and Stochastic Processes

Credits and Contact Hours

Three credit hours, 45 hours of instructor contact

Instructor's Name

Jing Yang

Textbook

Roy D. Yates, *Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers*, 3rd Edition, John Wiley & Sons, Inc., 2013.
ISBN: 978-1-118-32456-1

Specific Course Information

- a. Catalog description
Review of system analysis, probability, random variables, stochastic processes, auto correlation, power spectral density, systems with random inputs in the time and frequency domain, and applications.
- b. Pre-requisites or co-requisites: ELEG 3124, System and Signal Analysis. Required or Technical Elective: Required

Specific Goals for the Course

1. Specific outcomes of instructions
Understand basic concepts in probability theory and stochastic processes; Be familiar with the definition of discrete and continuous random variables; Be able to calculate probabilities of events, conditional probabilities, mean and variance of random variables, conditional distributions, autocorrelation, power spectrum density. Be able to apply probability and statistics to solve signal processing problems.
2. Indicate the student outcomes listed in Criterion 3 addressed by the course
 - (a) Students are required to apply probability and statistics to solve real-world problems.
 - (e) Students are required to formulate related real-world problems as probability problems and solve them.
 - (f) Students are required to work in groups to finish a course project.
 - (g) Students are required to submit a report for the course project.
 - (i) Students are required to collect information from multiple sources online for the course project.
 - (j) Probability problems related to contemporary issues will be formulated and given as examples in class.
 - (k) Students are required to use Matlab to solve 10% of homework assignments and the course project.

List of Topics

1. Experiments, Models, and Probabilities (8 class)

2. Discrete Random Variables (9 classes)
3. Continuous Random Variables (7 classes)
4. Pairs of Random Variables (9 classes)
5. Estimation and Hypothesis Testing (6 classes)
6. Stochastic Processes (6 classes)