ECE 361 Probability for Engineers Spring Quarter 2016-2017

Instructors

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Teaching Assistant(s)

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Course Objectives This course is designed to introduce basic principles of probability in engineering. The ultimate goal of the course is to make students familiar with basic concepts in probability, the language of probability theory, and development of probability models as well as concepts from inference, estimation and hypothesis testing.

Textbook **R. D. Yates and D. J. Goodman** **Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers**. Wiley

Grading

HW	5%	**HW due in Lecture, Tuesdays. No late submission will be accepted.**	
Midterm1	20%	Midterm2	20%
Final Exam	50 %		
Classroom interaction	5% (Attendance, willingness to engage/answer, etc.)		

COURSE OUTLINE (Tentative)

Module 1 Week # 1	Introduction, sets, sample spaces, events, Probability of events, probability properties, examples Chapters 1 & 2
Module 1 Week # 2	Conditional Probability, Bayes Rule. Independence, total probability Combinatorics review, permutations, combinations, etc. Chapters 1 & 2
Module 2 Week # 3	Random variables and probability distributions. Discrete random variables. Bernoulli trials, binomial random variables. . Computer modeling Chapters 3 & 4
Module 2 Week 4	Cumulative distribution function. Probability density function Chapters 3 & 4 Normal, exponential, Rayleigh, gamma variables. Bernoulli, binomial, geometric random variables
Module 2 Week 5	Properties of expected values, variances. Applications to engineering problems. Computer modeling **Midterm Exam (# 1)**
Module 2 Week 6	Applications to engineering problems. Transformations of random variables. Modeling and analysis Computer Modeling Chapters 3 & 4
Module 3 Week 7	Multiple Random Variables, joint and conditional probability distributions. Chapters 5- 7 Functions of Random Variables. Monotone functions and derived probability distributions.
Module 3 Week 8	Functions of multiple random variables. Sums of independent random variables, statistics. Moments of functions of random variables, expected values, variances, central limit theorem. Chapters 5- 7 **Midterm Exam (#2)**
Module 3 Week 9	Multiple random variables. Application to engineering problems. Modeling. Computer modeling Chapter 8-10
Module 4 Week 10	Estimation, Hypothesis testing and statistical Inference Chapter 11

Other Important Information

- Exams will be closed book, no calculator format. Students can bring a **single sheet and one page** of **typed materials** in **size 12 font** containing formulas (definitions, expressions of densities, integrals, etc.) on an 8.5 x 11 sheet. This sheet will be collected during the exam. If it contained any worked out examples or solutions of HW problems, **students will receive a 0 for the test.** You may use both sides of the sheet during the final.
- All cellphones must be turned off during the class hours. No web browsing permitted in class.

Module 1	a , f
Module 2	a, b, c, d, e, g, h, i, j, k
Module 3	a, b, c, d, e, g, h, i, j, k
Module 4	a, b, f

Student Outcomes

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.