

## EE 3817-002, Engineering Probability and Statistics

University of Colorado Denver  
College of Engineering and Applied Science

Term: Spring 2009  
Course times: TR 1:00 p.m. – 2:15 p.m.  
Course location: SI 220  
Office Hours: TR 11:00 a.m. – 12:00 p.m.

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Blackboard: E E 3817 002 ENGINEERING  
PROBABILITY AND STATISTICS  
FALL 2009

### Course Design

*Catalog Description:* Topics include: definition of probability, conditional probability, independence, combined experiments and Bernoulli trials, random variables, joint distribution and density functions, correlations, sample mean and variance. Also, introduction to random processes, auto and cross correlation functions, spectral density of random signals, responses of a linear system to random inputs.

**Semester Hours:** 3. **Prerequisite:** MATH 3195 and 2421.

*Instructor Description:* The knowledge taught in this course is commonly used in many areas of science and engineering. The purpose is to introduce the student to important tools that will be very helpful in future courses and professions.

*Course Objectives:* The objective of this course is to introduce students to the fundamentals of engineering probability, and to the concepts and methods of statistics.

### Requirements

*Required Texts:* R. Yates, D. Goodman, *Probability and Stochastic Processes (A Friendly Introduction for Electrical and Computer Engineers)*, 2<sup>nd</sup> edition, John Wiley and Sons, Inc., 2005.

*Assignments and Examinations:* Assignments will consist of weekly problem sets given as homework. They will be due at the beginning of class each Tuesday starting the second week of the semester. Late homework will not be accepted. The problem sets will be graded and handed back to the students in class, along with the solutions to the problems. There will be 3 examinations. The dates of these are as indicated in the class schedule below in this syllabus. The questions on the exam will be similar to those previously assigned in the problem sets. The second and third exams will focus on the material covered since the previous exam.

### Assessment Design

Grading will be based on the following percentages:

Homework	20%
Test 1	25%
Test 2	25%
Test 3	25%
Attendance/class participation	5%

Each problem set will be graded as a percentage and then the grades of all problem sets will be averaged for the semester. Tests will also be graded as a percentage. An overall percentage for the semester will then be calculated based on the weighted values above. The instructor will assign 0 – 5 percentage points based on the student’s class attendance, attentiveness, and interest. The final letter grade will be determined on a curve. The student will be able to see his or her grades for all work on Blackboard.

Homework and tests should be legible and clearly laid out, with answers indicated by drawing a box around them. The work done by the student to arrive at the answer should be included.

### Course Policies

Class attendance will be a factor in determining the student’s grade, so at times roll will be taken. It will be the responsibility of the student to get the material missed due to class absence. If there is a valid reason for an absence, the instructor will assist in this.

In general, late homework or missed tests can be made up only with a valid and verifiable excuse.

Students may work together on problem sets, but each student must turn in his or her own work. It will be evident if someone’s problem set is a copy of another student’s. In this case, both students will receive a grade of 0% for that assignment. Repeated offences of this nature will be grounds for failing the course.

The emphasis on the homework is based on the idea that the solving of the problems in the assignment by the student is necessary for comprehension of the subjects taught.

Tests will be done in class. The student may have one letter-size sheet of paper with equations on it to refer to.

### Course Schedule

The following schedule is not absolute, but provides a framework from which to operate. The tests will be given on the dates indicated. Problem sets (PS #1, PS #2, etc.) will be assigned each week in Tuesday’s class and will be due the following Tuesday. If there are any changes to this schedule, students will be notified in writing via their university email and on the Blackboard site for the course.

Class Schedule

Date	Topic	Required Reading	Assignments
<b>2009</b>			
Aug. 18	Set theory and probability	Chapter 1	
Aug. 20	Probability axioms		
Aug. 25	Conditional probability		PS #1 due
Aug. 27	Independence, sequential experiments, tree diagrams		
Sept. 1	Probability mass function	Chapter 2	PS #2 due
Sept. 3	Families of discrete random variables		
Sept. 8	Cumulative distribution function, averages		PS #3 due
Sept. 10	Functions of a random variable		
Sept. 15	Variance and standard deviation		PS #4 due
Sept. 17	<b>Test 1</b>		
Sept. 22	Cumulative distribution function	Chapter 3	PS #5 due

Sept. 24	Probability density function		
Sept. 29	Expected values		PS #6 due
Oct. 1	Families of continuous random variables		
Oct. 6	Derived random variables and conditioning		PS #7 due
Oct. 8	Joint cumulative distribution function	Chapter 4	
Oct. 13	Joint probability mass function and marginal PMF		PS #8 due
Oct. 15	Joint probability density function and marginal PDF		
Oct. 20	Functions of two random variables		PS #9 due
Oct. 22	Conditioning by event, independent random variables		
Oct. 27	<b>Test 2</b>		PS #10 due
Oct. 29	Expected values of sums	Chapter 6	
Nov. 3	PDF of the sum of two random variables		PS #11 due
Nov. 5	Moment generating functions		
Nov. 10	Central limit theorem		PS #12 due
Nov. 12	The Chernoff bound		
Nov. 17	Sample mean: expected value and variance	Chapter 7	PS #13 due
Nov. 19	Deviation of a random variable from expected value		
Nov. 24	Fall break	N/A	N/A
Nov. 26	Fall break	N/A	N/A
Dec. 1	Point estimates of model parameters		PS # 14 due
Dec. 3	Confidence intervals		
Dec. 8 or 10	<b>Test 3 – final exam</b>		

### Course Communication

Office hours will be Tuesdays and Thursdays, 11:00 a.m. – noon in NC 2615A. Students are encouraged to come in with any questions.

The instructor may also be contacted by email at [bruce.hines@ucdenver.edu](mailto:bruce.hines@ucdenver.edu).

Additionally, the Blackboard site for the course will provide information, including this syllabus, assignments, dates of tests, solutions to problem sets, and grades on problem sets and tests. The Blackboard site for the course is accessibly via [www.ucdenver.edu](http://www.ucdenver.edu).

### Students called for military duty

If you are a student in the military with the potential of being called to military service and /or training during the course of the semester, you are encouraged to contact Paul Rakowski in the Dean's office of the College of Engineering and Applied Science.