

UNIVERSITY OF KENTUCKY
COLLEGE OF ARTS AND SCIENCES

Course Information and Syllabus Document

STA 623-001 Theory of Probability
(formerly known as STA 531)
Fall 2009

Course meeting schedule

Lectures will take place on Tuesdays and Thursdays from 12:30 to 1:45 p.m. in CB 309.

Instructor contact information

Course Instructor:	Dr. Richard Charnigo
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Office Hours:	2:30 to 3:30 p.m. Mondays and Tuesdays

Catalog description

Axioms of probability, conditional probability, distribution functions, density and moment generating functions, expected values, discrete and continuous distributions, joint, marginal, and conditional distributions, transformations, covariance and correlation, inequalities, properties of sums from a random sample.

Course prerequisites

This course is open only to graduate students in Statistics.

Course objectives

1. You will learn how to calculate unconditional and conditional probabilities involving sets that may or may not be explicitly defined in terms of random variables.
2. You will learn how to calculate expected values and higher order moments of random variables.
3. You will become familiar with commonly encountered parametric families of discrete and continuous distributions as well as the broad classes of exponential and location/scale families.
4. You will learn how to define and calculate joint, marginal, and conditional probabilities involving two or more random variables.
5. You will become familiar with random sampling and properties of sums of random variables.

Textbook and course materials

Casella and Berger (2002). *Statistical Inference*, second edition. Pacific Grove, CA: Duxbury.

Course materials will be posted at {www.richardcharnigo.net/STA623F09/index.html} as the semester progresses. I will usually make an announcement by e-mail when new materials have been posted, so please check your e-mail daily and let me know by the third week of the semester if you have not been receiving my announcements.

Course requirements and learner evaluation

Written Assignments: There will be five written assignments for you to work on outside of class. Tentatively, the written assignments will be due at the end of class on the Thursdays of 10 September, 24 September, 22 October, 05 November, and 19 November. You are encouraged to work in self-selected groups of two or three, handing in one copy of the assignment for the group. However, you may work individually if you prefer. Written assignments are to be submitted in hard copy. Electronic submission (in Microsoft Word 2003 or PDF) may be allowed under exceptional circumstances if you obtain my permission in advance. Permission will not be given simply to facilitate cutting class.

Midterm and Final Examinations: There will be a non-collaborative take-home midterm examination that may be submitted any time between 12 Noon on Monday 05 October and 2 p.m. on Thursday 08 October. There will be a non-collaborative take-home final examination that may be submitted any time between 12 Noon on Monday 14 December and 2 p.m. on Thursday 17 December. By non-collaborative I mean that you are not permitted to discuss the examinations with anyone other than me, until after the deadlines for their submission. The examinations are to be submitted in hard copy, to me in person or under my office door. Electronic submission (in Microsoft Word 2003 or PDF) may be allowed under exceptional circumstances if you obtain my permission in advance.

Mock Comprehensive Examination: There will be a required mock comprehensive examination from **11:45 a.m. to 1:45 p.m. on Thursday 03 December**, location to be determined later. The mock comprehensive examination will be closed-book, closed-notes, and time-constrained as indicated above. The purpose of the mock comprehensive examination is to acclimate you to the conditions you will face with the actual departmental comprehensive examination in May or June 2010. The scope of the mock comprehensive examination will be all course material covered prior to Thanksgiving break.

Grading: Your grade for the course will be determined by the written assignments (40%), the midterm examination (15%), the mock comprehensive examination (15%), and the final examination (30%). There may be opportunities to earn bonus points (e.g., for finding mistakes in course materials or for outstanding participation in class discussions). The cutoff for an “A” will be no higher than 90%, the cutoff for a “B” will be no higher than 75%, and the cutoff for a “C” will be no higher than 60%.

Late Policy: Cases involving any of the following will be handled individually: University-excused absences, University-prescribed academic accommodations, recommendations for special consideration from the office of an appropriate Dean or the Ombud. Otherwise:

1. Late submission of a written assignment will be accepted at 75% credit within 24 hours of the deadline. If you are late with a written assignment, please leave it under my office door and send me an e-mail so that I know to look for it.

2. The midterm examination may not be submitted after 2 p.m. on Thursday 08 October. The final examination may not be submitted after 2 p.m. on Thursday 17 December. You are therefore strongly encouraged, though not required, to submit these examinations a day or two ahead of the deadlines.

3. Missing the mock comprehensive examination altogether will result in a score of zero. If you arrive after 11:45 a.m., you will still only have until 1:45 p.m. to complete the mock comprehensive examination.

Expectations of the course instructor

1. I expect you to attend essentially all classes. Your missing one or two classes for a legitimate reason is not a problem. However, your missing several classes not only hurts my feelings but also undermines your efforts to fulfill the course objectives. You pay dearly for your education – more than you may realize because the currency of your investment is not limited to dollars. So, please make the most of your learning opportunities!

2. I expect not just your attendance but also your active involvement. You can ask me questions during class if you are confused about what I have said or if your intellectual curiosity about the subject matter warrants it. I will often pose questions myself, which you will be invited to answer. You can also come to office hours and send me e-mail if you have questions.

3. I expect you to keep a positive attitude throughout the semester. This offering of STA 623 is being shaped to meet the needs of as many students as possible. In some lectures I may offer extended remarks of a technical nature to students with a highly advanced mathematical background; these remarks will, I hope, be valuable to such students. Those without a highly advanced mathematical background are asked for their patience while I offer these remarks.

Academic honesty

The Department of Statistics, the College of Arts and Sciences, and the University of Kentucky place a premium on academic honesty. Please refer to Sections 6.3 and 6.4 of {http://www.uky.edu/USC/New/rules_regulations/index.htm} for University definitions of and disciplinary policies involving cheating, plagiarism, and falsification of academic records.

Accommodations

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, submit to me a Letter of Accommodation from the Disability Resource Center at {www.uky.edu/TLC/grants/uk_ed/services/drc.html}. If you have not already done so, please register with the Disability Resource Center for coordination of campus disability services available to students with disabilities.

Inclement weather

The University of Kentucky has a detailed policy for decisions to close in inclement weather. This policy is described at {<http://www.uky.edu/MicroLabs/documents/p-weather.pdf>}, or you can call 859.257.5684.

Unforeseen contingencies

In the unlikely event that an unforeseen contingency requires additional course policies, you will be promptly notified of such policies in an e-mail memorandum.

Schedule of lecture topics

Objective	Dates	Topics
1. You will learn how to calculate unconditional and conditional probabilities involving sets that may or may not be explicitly defined in terms of random variables.	27 August	Set theory
	01 September	Basics of probability theory
	03 September	Conditional probability and independence
	08 September	Random variables
	10 September	Distribution functions
	15 September	Density and mass functions
2. You will learn how to calculate expected values and higher order moments of random variables.	17 September	Distributions of functions of a random variable
	22 September 24 September	Expected values
	29 September 01 October	Moments and moment generating functions
	06 October	Differentiating under an integral sign

3. You will become familiar with commonly encountered parametric families of discrete and continuous distributions as well as the broad classes of exponential and location/scale families.	08 October 13 October	Discrete distributions
	15 October 20 October	Continuous distributions
	22 October	Exponential families
	27 October	Location and scale families
	29 October	Inequalities and identities
4. You will learn how to define and calculate joint, marginal, and conditional probabilities involving two or more random variables.	03 November 05 November	Joint and marginal distributions
	10 November	Conditional distributions and independence
	12 November	Bivariate transformations
	17 November	Covariance and correlation
	19 November	Multivariate distributions
	24 November	Inequalities
5. You will become familiar with random sampling and properties of sums of random variables.	01 December	Basic concepts of random samples
	10 December	Sums of random variables from a random sample

NOTES:

1. The mock comprehensive examination will be on 03 December from **11:45 a.m. to 1:45 p.m.**
2. We will use class time on 08 December to discuss the mock comprehensive examination.