UNIVERSITY OF KENTUCKY
COLLEGE OF ARTS AND SCIENCES

Course Information and Syllabus Document

STA 623-001 Theory of Probability
Fall 2013

Course meeting schedule

Lectures will ordinarily take place on Tuesdays and Thursdays from 11 a.m. to 12:15 p.m. in MDS 335. However, I have "traded" my time on Tuesday 28 November with your STA 602 instructor in exchange for his time (11 a.m. to 1 p.m.) on Wednesday 04 December.

Instructor contact information

Course Instructor:	Dr. Richard Charnigo	Office:	MDS 203
Telephone:	859.218.2072	E-Mail:	RJCharn2@aol.com
Home Page:	www.richardcharnigo.net	Office Hours:	each Thursday on which I lecture, from 1 to 3 p.m.

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 for graduate students in Statistics; exceptions will be made only with approval from the Director of Graduate Studies 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/STA623F13/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 four 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 26 September, 10 October, 07 November, and 21 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.

Take-Home Midterm and Final Examinations: There will be a non-collaborative take-home midterm examination due at the end of class on Tuesday 22 October. There will be a non-collaborative take-home final examination due at 3 p.m. on Tuesday 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.

In-Class Assessment: There will be a required in-class assessment from 11 a.m. to 1 p.m. on Wednesday 04 December, during the time you normally meet for STA 602. (Your STA 602 instructor has "traded" this time to me in exchange for our usual time on Tuesday 26 November.) The in-class assessment will be closed-book, closed-notes, and time-constrained as indicated above. The purpose of the in-class assessment is to help acclimate you to conditions that you may face on the departmental comprehensive examination in May or June 2014. However, at the risk of stating the obvious, a certain level of performance on the in-class assessment is not a guarantee of a comparable level of performance on the departmental comprehensive examination, which covers other courses besides this one. The scope of the in-class assessment 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 in-class assessment (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 or an examination will be accepted at 75% credit within 24 hours of the deadline. If you are late with a written assignment or an examination, please leave it under my office door and send me an e-mail so that I know to look for it.

       2. Missing the in-class assessment altogether will result in a score of zero. If you arrive after 11 a.m., you will still only have until 1 p.m. to complete the in-class assessment.

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 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 are always welcome to ask me questions during class. 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.	29 August	Set theory
	03 September	Basics of probability theory
	05 September	Conditional probability and independence
	10 September	Random variables
	12 September	Distribution functions
	17 September	Density and mass functions
2. You will learn how to calculate expected values and higher order moments of random variables.	19 September	Distributions of functions of a random variable
	24 September 26 September	Expected values
	01 October 03 October	Moments and moment generating functions
	08 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.	10 October 15 October	Discrete distributions
	17 October 22 October	Continuous distributions
	24 October	Exponential families
	29 October	Location and scale families
	31 October	Inequalities and identities
4. You will learn how to define and calculate joint, marginal, and conditional probabilities involving two or more random variables.	05 November 07 November	Joint and marginal distributions
	12 November	Conditional distributions and independence
	14 November	Bivariate transformations
	19 November	Covariance and correlation
	21 November	Multivariate distributions
	03 December	Inequalities
5. You will become familiar with random sampling and properties of sums of random variables.	05 December	Basic concepts of random samples
	12 December	Sums of random variables from a random sample

NOTES:
1. The take-home midterm examination is due at on the end of class on Tuesday 22 October.
2. The STA 623 in-class assessment will occur on Wednesday 04 December from 11 a.m. to 1 p.m., during the time you normally meet for STA 602. (Your STA 602 instructor has "traded" this time to me in exchange for our usual time on Tuesday 26 November.)
3. The lecture on Tuesday 10 December will be used to discuss the in-class assessment.
4. The take-home final examination is due at 3 p.m. on Tuesday 17 December.