

Math 411A Fall 2011
Introduction to Probability Theory

Instructor: Dr. Kathy Temple

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Office Hours: MTWTh 2 - 2:50PM, and by appointment.

Course Goals: This course covers the basic concepts of probability theory and forms the foundation for mathematical statistics. Specifically, we will cover:

- Basic ideas in combinatorics
- The axiomatic approach to probability theory
- Conditional probability, independence, and Bayes' Theorem
- Discrete and continuous random variables and their distributions, multivariate distributions, and marginal and conditional distributions
- Mathematical expectations of random variables, moments, moment generating functions, and conditional expectations
- As time permits, various families of discrete distributions

Prerequisite: Math 273 or permission. In particular, you need to be comfortable with infinite series and single and double integrals (including improper integrals).

Required Text: Miller and Miller, *John E. Freund's Mathematical Statistics with Applications*, 7th Edition. We will cover chapters 1-4 and the beginning of chapter 5.

Evaluation:

- Two in-class exams (20% each); tentative dates: Wednesday, October 12, and Wednesday, November 9.
- Comprehensive final exam (30%); given Tuesday, December 6, 8-10AM.
- Homework (21%).
- Problem session write-ups (9%); see below for more information.

Course Conduct:

- **Required Materials:** The textbook is required. You will also want at least a scientific calculator. For those planning to take Exam P, I strongly recommend the TI-30X MultiView or TI-30XII.
- **Homework:** Homework will be assigned often in class and due dates will be announced at the time of the assignment. Homework must be done neatly, *stapled*, and written on clean-edged paper (no notebook fringes). Your work should be clear, in a logical order, and provide sufficient explanation. What's sufficient explanation? A good guide is to think

about whether another student in the class who didn't know how to do this particular problem could understand your solution. This will also help you understand your solution later! Credit will not be given for late homework.

- **Problem Session write-ups:** We will have “problem sessions” each Tuesday [the day may shift at the end of the quarter due to holidays], where instead of covering new material in class you will be given several problems to work on. You are encouraged to work on these with others in the class. At the end of class we may discuss the problems briefly, and then students will be assigned to write up solutions to each of the problems to be distributed to the rest of the class. You must write up 3 problems over the course of the quarter, and may not do more than one per week. Problems will be assigned first by taking volunteers among those who still have write-ups to complete and then, if there are no volunteers, choosing among that same group at random. When writing up a solution to a problem, remember that your fellow students are going to be reading it. This means that it needs to be legible – if you have particularly poor handwriting, this might be a good time to learn how to typeset mathematics – and provide enough detail that your fellow students can easily follow your solution. English words (or sentences!), pictures, etc. are encouraged. *Your solution must either be submitted to me electronically or in a form suitable for scanning.* To receive credit, your correct solution is due to me by 10AM on Friday. Each solution will be worth 3% of your final grade. You are welcome, and in fact strongly encouraged, to discuss your solution with me before it is due, and I will be happy to read drafts, etc. Late solutions will be docked one-half of one percentage point per business day, so, for instance, a solution that is one day late would give you 2.5% towards your final grade instead of 3%. Credit will not be given until a solution is correct and reasonably well-written. Towards the end of the quarter, if we have extra problems available, you may volunteer to take on additional write-ups for an extra 1% added to your course grade, per problem. I will post submitted solutions on Blackboard, typically sometime Friday afternoon.
- **Exams:** Any changes to the tentative exam schedule will be announced in advance. Make-up arrangements must be made prior to an exam unless you can document an unexpected circumstance beyond your control that prevented you from taking the exam.