

# MAT516 - Spring 2009

## Probability Theory and Statistics for Teachers

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Class meets MW 6:50-8:10pm, Chemistry 128  
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This course provides an elementary introduction to probability and statistics. Familiarity with proofs and abstract reasoning similar to the material covered in MAT511 is expected as a prerequisite. Students are responsible for all topics covered in the readings and lectures. Assigned material should be read before the class. Lectures may go beyond the reading, and not every detail in the reading will be covered in class.

### **Tentative list of topics to be covered:**

*Part 1, Basic Probability Theory:* Probability Space, Random Events, Combinatorics; Conditional Probability and Independence; Discrete and Continuous Random Variables; Standard Probability Distributions; Expectation, Variance, Standard Deviation; Law of Large Numbers; Central Limit Theorem.

*Part 2: Basic Statistics:* Estimators, Confidence Intervals, Hypotheses Testing.

*Part 3: Probability Potpourri:* Information and Entropy; Random Walks; Markov Chains; Poisson Process; Brownian Motion.

### **Textbook**

*Recommended:* Grinstead, Snell, Introduction to Probability

*Available on-line at:*

[http://www.dartmouth.edu/~chance/teaching\\_aids/books\\_articles/probability\\_book/pdf.html](http://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/pdf.html)

*Recommended:* Feller, Introduction to Probability, vol. 1

*Recommended:* Isaac, The Pleasures of Probability

These books will be held on reserve in the Math-Physics Library during the Spring term.

### **Homework:**

Homework will be assigned every week and will consist of 7 – 10 problems. It will be posted on the course web page every Wednesday evening and will be due the next Wednesday in class. Late homework will not be accepted. Collaboration between students is encouraged, but you must write your own solutions, understand them and give credit to your collaborators.

### **Tests:**

There will be one take home test covering the material in Part 1, one in-class test covering Parts 1 and 2 and a cumulative in-class final. There will be no make-up tests.

### **Grading policy:**

Grading policy will be based on one the the following two schedules, whichever yields a better grade.

*Schedule A:* Homework 30%, Tests 30%, Final 40%

*Schedule B:* Homework 0%, Tests 40%, Final 60%

*Welcome to MAT516 and good luck with the course!*