# **Probability and Mathematical Statistics I**

Department of Statistics 36-325/725 Fall 2002

LECTURES: Tuesday and Thursday 9:00 – 10:20 PH A18A

**INSTRUCTOR:** Larry Wasserman

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TEXT: *All of Statistics: A Crash Course in Probability and Statistical Inference* by Larry Wasserman. (2002). Available on the course website (Available from CMU only).

## OTHER REFERENCES:

Elementary: *Probability and Statistics*. Third Edition. by Morris H. DeGroot and Mark J. Schervish. (2002). Addison-Wesley.

Intermediate: *Statistical Inference*: George Casella and Roger Berger. (1990). Wadsworth. Advanced: *Theory of Point Estimation*. Eric Lehmann and George Casella. (1998). Springer. Advanced: *Asymptotic Statistics*. Aad van der Vaart. (1998). Cambridge.

# **INTRODUCTION**

This is an intense, fast-paced course on probability and statistics. It is intended for undergraduates in Statistics, Mathematics and Computer Science and also for graduate students in Computer Science and related fields. I assume you have a strong background in calculus and a knowledge of basic linear algebra (vectors and matrices). The course is excellent preparation for studying statistics, machine learning, data mining and artificial intelligence. I do not assume any knowledge of probability or statistics but be forewarned that the course does move rapidly.

## 36-325 or 36-725?

If you are an undergraduate student, you should register in 36-325. If you are a graduate student, you should register in 36-725. The homeworks and tests will be the same for all students. When I assign grades, I will do so separately for the two groups. Graduate students will be graded on a more difficult scale.

## **WEBSITE and TEXT**

Check the website on a regular basis:

www.stat.cmu.edu/larry/ = stat325.02

The website has the homeworks, handouts, and the text. Note: you cannot access the book from non-CMU computer accounts. Download the book and read the relevant chapter **before** class. Most files on the website are in postscript. The website shows you where to get a free postscript previewer (ghostview) if you don't have one already. I recommend using ghostview instead of pdf.

### ASSESSMENT

Problems will be assigned each week. You may have to read ahead to do some of the problems. You should download the assignments from the web. Homework is to be handed in at the beginning of class, usually on Thursdays. I will post solutions each week. I encourage you to discuss homework problems with other students but do **not** copy other students' assignments. In other words, work together but write up your solutions on your own. When you work with another student, please write: "I worked with ... " on this assignment.

There will be 3 in-class tests but no final examination. The test dates are:

# Test 1: Thursday, September 26Test 2: Thursday, October 31Test 3: Thursday, December 5

Write these dates down now! If you miss a test, bring a valid medical excuse within one week. There are no makeup tests. Notes written on one side of one sheet of paper will be permitted for the tests and the exam. Calculators are also allowed (but not needed). The final grade will be based on the following breakdown:

Homework	25%
Test 1	25%
Test 2	25%
Test 3	25%

## LATE HOMEWORK

Homework is due at the beginning of class. Late homework will not be accepted.

## COMPUTING

The assignments will involve some computing. We will use R which is available free at http://www.cran.r-project.org/

You may also use Splus which is available on Andrew by typing: Splus. Splus and R are essentially the same but R is faster and is free. I will teach you all the R you need to know. You may use something other than R if you choose but then you are on your own.

# TOPICS

The course follows my book. The main topics are:

- Introduction to Probability
- Random Variables
- Expectation
- Inequalities
- Convergence of Random Variables
- Introduction to Statistical Inference

# **OFFICE HOURS**

I will not keep formal office hours. If you wish to meet with me, call or send email and make an appointment. The grader will keep office hours.