MGT 403 – Probability Modeling and Statistics
Fall 2012

Probability Modeling	
Professor Elisa Long Office: 52 Hillhouse, Room 321 Email: elisa.long@yale.edu Phone: 203-436-4966 Office hours: Wednesdays, 4-6pm	Assistant: Heather Amero Office: 55 Hillhouse, Room 004 Email: heather.amero@yale.edu Phone: 203-436-4832
Statistics	
Professor Constança Esteves-Sorenson Office: 55 Hillhouse, Room 306B Email: constanca.esteves-sorenson@yale.edu Phone: 203-432-5334 Office hours: Mon and Wed, 11.45-12.45 pm	Assistant: Judy Crocker/Jennifer Arango Office: 55 Hillhouse, Room 004 Email: judy.crocker@yale.edu jennifer.arango@yale.edu Phone: 203-432-8548

Overview

Probability and statistics are fundamental to management education. This course introduces you to these subjects in two parts. The first seven sessions (taught by Elisa Long) introduce probability modeling using nothing more than basic Excel commands. The second eight sessions (taught by Constança Esteves-Sorenson) cover statistical estimation, hypothesis testing and regression while using STATA, a data analysis and statistics program. Applications of these methods will surface in your perspectives and electives at SOM, and will prove useful for decision-making applications in financial analysis, marketing, operations management, policy modeling, strategy, and other areas.

Class Meetings

Tuesdays and Thursdays, beginning Tuesday, August 21st (Room A51):

Silver Cohort: 8:30-9:50am
Green Cohort: 10:10-11:30am
Gold Cohort: 1:00-2:20pm
Blue Cohort: 2:40-4:00pm

Extra session on Friday, August 24th (Room A53):

Silver Cohort: 8:30-9:50am
Blue Cohort: 10:10-11:30am
Green Cohort: 1:00-2:20pm
Gold Cohort: 2:40-4:00pm

Teaching Assistants (schedule of workshops/office hours TBA)

Silver Cohort: Emily Barfoot, Jonathan Wong
Green Cohort: Sue AnderBois, Alex Poukchanski
Gold Cohort: Lee Martin, Cheri Tan
Blue Cohort: Wei Peng, Ted Stein

Although you may attend any workshop or office hours, please email any questions to your cohort's TA.

Software
Microsoft Excel (probability) and STATA (statistics).

Course Readings and Lecture Notes
Posted on ClassesV2 website.

Homework, Exams and Grading
There will be regular homework assignments (posted on our ClassesV2 website), a final probability exam on **Monday, September 10th, 6:00-8:15 pm**, and a take-home statistics exam posted in the **evening of Tuesday, October 9th** and due by **Thursday, October 11th, 8:45 am**.

Your course grade will be a 50/50 weighting of your *Probability Grade* and your *Statistics Grade*.
For each Probability homework, only 1-3 *randomly sampled* questions will be graded (although solutions for all problems will be made available). Late homework submissions will not be accepted, and *a grade of ZERO will be recorded for late/missed homework*.

Your *Probability Grade* will be determined in the following manner:

$GRADE_1$ = 20% (Homework) + 80% (Exam)
$GRADE_2$ = 100% (Exam)
PROBABILITY GRADE = maximum {$GRADE_1$, $GRADE_2$}

Note that submitting homework is not required. However, submitting homework can only raise your grade beyond one based solely on the exam. In addition, it is empirically true that those who submit regular homework assignments tend to fare better on the exams. Homework helps!

Your *Statistics Grade* will be determined in the following manner:

STATISTICS GRADE = 45% (Homework) + 50% (Take-home Exam)
+ 5% (STATA Training Assignment)

All questions in the Statistics homeworks will be graded.

Your FINAL COURSE GRADE = 50% (PROBABILITY GRADE) + 50% (STATISTICS GRADE).

Schedule of Classes

Date	**Topic**	**Instructor**
Tue, Aug. 21	Probability Experiments	Elisa Long
Thu, Aug. 23	Probability Modeling	Elisa Long
Fri, Aug. 24	Random Variables	Elisa Long
Tue, Aug. 28	Binomial Distribution	Elisa Long
Thu, Aug. 30	Normal Distribution	Elisa Long
Tue, Sep. 4	Sums of Random Variables and Covariance	Elisa Long
Thu, Sep. 6	Central Limit Theorem and Sampling Distributions	Elisa Long
Mon, Sep. 10	***In-class probability exam* (6:00-8:15pm)**	Elisa Long

Tue, Sep. 11	Point Estimation and Large Sample Confidence intervals *Reading for class: notes for lecture 1*	Constança Esteves-Sorenson
Thu, Sep. 13	Hypothesis Tests *Reading for class: notes for lecture 2*	Constança Esteves-Sorenson
Tue, Sep. 18	Introduction to Regression *Reading for class: notes for lecture 3*	Constança Esteves-Sorenson
Thu, Sep. 20	Non-linearities and Dummy Variables *Reading for class: notes for lecture 4*	Constança Esteves-Sorenson
Tue, Sep. 25	Multiple Regression *Reading for class: notes for lecture 5/6*	Constança Esteves-Sorenson
Thu, Sep. 27	Multiple Regression *Reading for class: notes for lecture 5/6*	Constança Esteves-Sorenson
Tue, Oct. 2	Multiple Regression-Quadratics *Reading for class: notes for lecture 7* Forecasting and Causality in a Regression Context *Reading for class: notes for lecture 8*	Constança Esteves-Sorenson
Thu, Oct. 4	Forecasting and Causality in a Regression Context *Reading for class: notes for lecture 8*	Constança Esteves-Sorenson
Oct. 9-11	***Take-home statistics exam***	Constança Esteves-Sorenson

Optional Reading

Though there are no required textbooks for the class, here are some recommended books if you would like to learn more about these topics. Additional class notes will be posted on ClassesV2.

For Probability:

1) Introduction to Probability, 2nd Edition by Dimitri P. Bertsekas and John N. Tsitsiklis. Basic introductory book with some additional advanced material. Listed on Amazon.com for $86.
2) Introduction to Probability, 2nd Edition by Charles M. Grinstead and J. Laurie Snell. Comprehensive introduction to probability with many examples, but requires knowledge of calculus. Listed on Amazon.com for $45.
   Freely available at:
   www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/amsbook.mac.pdf
3) Making Hard Decisions with Decision Tools Suite by Robert T. Clemen and Terence Reilly. Provides many MBA-level case studies, building on basic probability theory to discuss decision trees, modeling in Excel, and Monte Carlo simulation. Includes PrecisionTree and @Risk software, which you may use in future courses. Listed on Amazon.com starting at $63.

For Statistics:

1) Cartoon Guide to Statistics by Larry Gonick and Woollcott Smith. It covers the material in probability and statistics in a nice intuitive way. Used in other programs (e.g. Harvard Kennedy School). Listed on Amazon.com for $12.
2) Statistics, 4th Edition by David Freedman, Robert Pisani, and Roger Purves. Very nice

introductory book, covering basic material: basics of means, medians, differences in means, and basics of regression. Listed on Amazon.com for $110.

3) Introductory Econometrics: A Modern Approach (with Economic Applications Online, Econometrics Data Sets with Solutions Manual Web Site Printed Access Card), by Jeffrey Wooldridge. Contains all the material covered in Statistics on regression as well as more advanced material. Used in many undergraduate and some masters courses. Good solutions manual. All the datasets and analysis are in Stata. Listed on Amazon.com for $166.
4) How to Lie with Statistics by Darrell Huff and Irving Geis (Paperback - Oct 17, 1993) Old but great book on how to think critically about statistics and how statistics is reported in the media. Has good examples on the difference between correlation and causality between two variables. Listed on Amazon.com for $6.

For Stata:

1) A Gentle Introduction to Stata, Third Edition by Alan C. Acock. Covers all the procedures described in the Stata Training Tutorial and most the material covered in the Statistics part of MGT 403: test of means, proportions, multiple regression, etc. Does a good job of bridging the gap between Stata and Statistics. Listed on Amazon.com for $70.
2) Data Analysis Using Stata, Second Edition by Ulrich Kohler and Frauke Kreuter. It covers more advanced data analysis techniques and how to program in Stata. Listed on Amazon.com for $50.

Honor Code

Students are expected to follow SOM's Honor Code when submitting homework assignments and completing the exams. Any violation of the honor code will strictly not be tolerated, and students in violation will be referred to SOM's Honor Committee. Please contact either instructor if you have questions regarding this policy.
http://www.yale.edu/printer/bulletin/htmlfiles/som/rights-and-responsibilities-of-students.html