INTRODUCTION TO BIOSTATISTICS  
JANUARY 24 - APRIL 14, 2008  
Weill Cornell Medical College  
Masters in Clinical Investigation  
(Also offered to Laboratory Researchers)  

Meeting Time:  
Lectures:  
Mondays 4:00 - 5:30 PM, January 28 to April 14, 2008.  
No class on February 18, 2008.  

Mandatory STATA Computer Labs (2 sessions only):  
Thursdays 5:00 - 6:30 PM January 24 and January 31, 2008, (NOTE different time and day)  

Meeting Place: Room F-539 (All lectures and Computer Labs)  

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Schedule

January 24, 2008 (5:00 – 6:30 PM)
Computer Lab: Introduction to STATA 10

January 28, 2008
1. Introduction: Working with data
   • What is Statistics?
   • Working with data:
     o Types of data (continuous, discrete, survival)
   • Organizing and displaying data:
     o Frequency tables
     o Graphs and plots:
       ▪ Histograms
       ▪ Scatter plots
       ▪ Frequency and cumulative frequency plots
   • Summary measures:
     o Central tendency (mean, median, mode, percentiles)
     o Dispersion and variability (variance, standard deviation, range, coefficient of variation)

January 31, 2008 (5:00 – 6:30 PM)
Computer Lab: Introduction to STATA 10 (cont)

February 4, 2008
2. The normal distribution and sampling distribution of the mean
   • The normal distribution
   • Sampling distributions
   • Central Limit Theorem

February 11, 2008
3. Statistical Inference. Introduction to estimation, confidence intervals and hypothesis testing. Single sample hypothesis testing and interval estimation.
   • Null and alternative hypothesis
   • Type I and Type II errors
   • One tailed versus two tailed tests
   • Relationship between hypothesis testing and confidence intervals (CI)
   • Estimating the CI for the mean
   • Testing hypothesis about the mean
No class on February 18, 2008 (Presidents’ Day)

February 25, 2008
4. Test for and two sample means, proportions.
   • Testing the differences of two means
     o Student’s t-test
     o Paired t-test
   • Testing the differences of two proportions

March 3, 2008
5. Analysis of Variance (ANOVA)
   • Testing the difference between 3 or more means
     o The ANOVA
   • Multiple comparisons

March 10, 2008
6. Chi-square tests and Fisher’s exact tests
   • Test of independence
   • Two by two (2 x 2) contingency tables
   • Generalization to n x r contingency tables

March 17, 2008
7. Correlation and Linear Regression
   • Correlation as a measure of linear association
   • Regression analysis: The method of least squares
   • Parameter inferences
   • Diagnostic tests and goodness of fit.

March 24, 2008
8. Multiple Linear Regression, and Analysis of Covariance
   • Generalization of linear regression to more than one explanatory variable
   • Analysis of Covariance
   • Summary of the course

March 31, 2008
9. Logistic Regression
   • Estimating the odd ratio in a 2x2 table
   • The logistic regression model
   • Interpretation of regression parameters
April 7, 2008
10. Logistic Regression – Survival Analysis
   • Multivariate logistic regression
   • Survival analysis – Censored data
   • Survival and hazard functions

April 14, 2008
11. Survival Analysis
   • Kaplan-Meier estimator
   • Log-rank text
   • Introduction to Cox proportional hazard models

April 21, 2008: Final Exam due

April 28, 2008, Final Project due

Required Software

STATA 10

Textbooks

Course materials have been borrowed for multiple sources.
Some suggested textbooks are
   ISBN: 0-7674-1752-6

   ISBN: 0-534-37068-3

Stata Books


3. An Introduction to Stata for Health Researchers (2006) Svend Juul
   ISBN: 1-59718-010-6
Course Expectations and Evaluation:

1. Attendance is necessary. **No beepers or cell phones please.**
2. Weekly home works due the following class, that will emphasize material learnt in class using STATA (30%)
3. Final exam: Short take-home exam testing statistical concepts. (30%)
4. Final project using data from your own research. (40%)