Statistics Courses for Undergraduates from the Statistics Dept

Jun Liu
Professor of Statistics
Statisticians, Statistical problems, and attractions

Statistical Problems:
Any problem that involves uncertainties, basically all the problems.

Statisticians:
Some geeks who play with messy numbers
Or Information Scientist

Most Important of all:
You can do anything you like and get paid!
What roles can he/she play?

• Traditional Line and New Challenges
  – “Typical” statistical problems more demanding than before.
  – New technologies generate new data and new opportunities (e.g., engineering/computer problems; bioinformatics; data mining)
Examples

• **Bioinformatics/biology**
  – Traditional territory: genetics and epidemiology
  – New frontiers: gene expression analysis, genome analysis, molecular structural analysis, drug design, biomarker selection, etc.

• **Engineering and Computer Science**
  – Wireless communications
  – Artificial intelligence (e.g., Bayesian network)

• **Chemistry and Physics**
  – Analyzing single-molecule data
  – Analyzing and modeling astrophysics data

• **Social Sciences**
  – Election modeling
  – Inferring causality
  – Economical data analysis
Statistics concentrators

• Basic requirements
  – 7 half-courses from stat (100/101/102/ 104, 110, 111, 139, 140, 149, 160, 171, 181, any 200 level courses).
  – 5 related half-courses
  – Math courses to the level of Math 21b are required by the end of 2nd year. Math 21b and its prerequisites count as 2 related half-courses.
  – One half-course other than Stat 110 and 111 may be taken Pass/Fail

• Honor requirements --- thesis

• Joint concentrators --- more courses
  – Details are found in the student handbook
Brief introduction of courses

• Stat 100/101/102/104
  – Stat 100: Introduction to Quantitative Methods
    • Introduces the key ideas underlying statistical and quantitative reasoning, including fundamentals of probability. Emphasizes the simple linear regression and applications in non-experimental fields including, but not limited to, economics.
    • Stat 101 emphasizes ANOVA, application to psychology and other behavioral sciences;
    • Stat 104 covers both regression and ANOVA
  – Stat 102: Fundamentals of Biostatistics
• Stat 110: Introduction to Probability (require math 21a/21b)
• Stat 111: Introduction to theoretical statistics
• Stat 160: Survey methods. Methods for design and analysis of sample surveys (require stat 111 or 139).
• Stat 171: Introduction to Stochastic processes
Contact information

• Department Administrator
  – Betsey Cogswell; 617-496-5497, cogswell@stat.harvard.edu

• Head Tutors:
  – Professor Samuel Kou, 617-496-8423, kou@stat.harvard.edu
  – Professor Jun Liu, 617-495-1600, jliu@stat.harvard.edu; http://www.fas.harvard.edu/~junliu