INTRODUCTION TO STATISTICAL ANALYSIS (STAT 2450)  
DRAFT

Prerequisites: Math 152.X or Math 1151 or Math 1156 or Math 1131 or Math 1181H or Math 1161.XX or equivalent or permission of instructor

Conversion note: Converted from 5 quarter hour course Stat 245


Course Notes: Statistics 2450 Course Notes – Autumn 2012, by Jackie Miller

Course Structure: This course is taught on the lecture-recitation system. There are two lectures and one recitation / computer labs each week. The recitation/computer labs are smaller size classes devoted to learning to use the computer software, answering questions, and going over problems and examples.

Course Goals: This course satisfies the learning goals of the GEC Data Analysis requirement, which are to develop an understanding of the basic ideas of statistical reasoning. This course seeks to encourage students to actively think about statistical issues arising in real problems and to understand the basic statistical techniques used to generate, summarize, and draw conclusions from data.

Course Objectives:

• To introduce you to methods of collecting data
  o By providing examples of methods of random sampling
  o By explaining correct procedures for designing experiments and observational studies
  o By explaining uses and misuses of sample surveys
• To enable you to use statistical tools for presentation of data and to understand presentations of data
  o By discussing when different types of graphical displays are appropriate and explaining proper methods of constructing graphical displays
  o By using appropriate summary statistics to describe the distribution of data
  o By introducing statistical terminology used to describe data and distributions
• To enable you to analyze data
  o By using simple linear regression for bivariate data
  o By constructing and interpreting confidence intervals for both a single sample and two samples
  o By conducting and interpreting hypothesis tests for both a single sample and two samples
• To enable you to understand basic probability and statistical concepts
  o By presenting and using rules of probability
  o By discussing binomial and normal probability distributions
• By discussing sampling distributions and the use of the Central Limit Theorem as the foundation of inference
• To enable you to evaluate statistical procedures and summaries
  o By discussing assumptions and conditions for analysis procedures
  o By identifying sources of bias in sampling, experiment, and survey methods
  o By discussing appropriate nature and scope of conclusions for analysis procedures

Tentative Course Topics:

• Sampling and experimental design
• Tables and graphical displays for summarizing categorical and quantitative variables
• Numerical summaries for quantitative variables
• Probability, including basic rules and counting techniques
• Random variables – distributions, mean, variance
• Binomial distribution
• Normal distribution
• Sampling distributions
• Confidence intervals and hypothesis testing for a single mean
• Confidence intervals and hypothesis testing for a single proportion
• One-way ANOVA
• Correlation and linear regression
• Inference for two-way tables
• (time allowing) Confidence intervals and hypothesis testing based on two samples