Statistics   Soner Tunay
EC 151.02   Carney 142
Spring 2000   e-mail: tunay@bc.edu

This is an introductory course in statistics. Contrary to some belief, Statistics is neither simple-minded formula crunching, nor pure mathematical manipulation. Instead, statistics is the science of collecting, summarizing and interpreting the data. In this course, you will learn how to apply Statistics to real-life problems. Statistical concepts will be presented with applications in mind. The course has three major sections: Descriptive statistics, probability and distributions and statistical inference.

Lecture Hours: Fulton 110 -M W F 9 AM.

Office Hours: W F 10-11 AM.

Text: Keller and Warrack: Statistics for Management and Economics, abbreviated forth ed., Wardswoth, 1998 (required).
        Study Guide (required).
        Student's Solution Manual (recommended).

Course requirements:

Quizzes (20%)	A number of quizzes, as frequent as every week.
Mid-term exams (20% each)	1st on March 1st, Wed. and 2nd. on April 12th, Wed.
Final exam (30%)	Announced by the registrar

Homework and class participation (10%)

Course organization and expectations: There will be problem sets almost every week. I will also provide some computer assignments to introduce you to spreadsheet computing. I will not accept any homework that is not turned in on time. I encourage small group study on problem sets so long as everyone contributes to the problem solving equally. I believe that teamwork improves your abilities to share ideas and learn from others. Naturally, you will be evaluated from your own work on the exams.

The structure of the course will follow the textbook closely. You are required to read the assigned sections in the textbook. I also believe that a quick glance at the topics before each class helps you learn the material faster.

You can find course handouts as well as other learning resources on my web site at www2.bc.edu/~tunay.

Syllabus

Introduction to Statistics (Ch. 1)

Descriptive Statistics (Ch. 2,4)
    i) Measures of central tendency (4.2)
- Mean
- Mode
- Median

    ii) Measures of dispersion (4.3, 4.4)
- Range
- Variance
- Standard Deviation
- Coefficient of Variation
- Interpreting Standard Deviation

    iii) Measures of association (4.6)
- Covariance
- Coefficient of Correlation

    iv) Graphical descriptions: Histograms (2.3)

Probability (Ch. 6)
    i) Probability Rules and Random Events (6.2, 6.3)
- Random Experiment
- Assigning Probabilities
- Concepts of Probability

    ii) Probability Distributions (6.4)
    iii) Conditional Probability and Probability Trees (6.2, 6.3)
- Conditional Probability
- Probability Trees

    iv) Expected Value and Variance (6.5)
- Laws of Expected Value
- Laws of Variance

    v) Binomial Distribution (6.7)
- Binomial Experiment
- Using Binomial Tables

Continuous Random Variables and Probability Distributions (Ch. 7)
    i) Probability Distributions for Continuous Random Variables (7.2)
- Uniform Distribution

    ii) The Normal Distribution (7.3)
- Finding Normal Probabilities

Sampling Distribution (Ch. 8)
    i) Sampling Distribution of the Sample Mean (**8.2**)
        • Central Limit Theorem

Point Estimation (Ch. 9)
    i) Properties of Estimators (9.2)
        • Unbiasness, Efficiency and Consistency

Interval Estimation (Ch. 9, 11)
    i) Confidence Intervals (9.2, 9.3)
        • Confidence Interval Estimation
        • Interpreting Confidence Interval Estimate
    ii) Student's t distribution (11.1, 11.2)

Hypothesis Testing (Ch. 10, 11)
    i) Concepts of Hypothesis Testing (10.2)
    ii) Tests of the Mean (10.3, 11.2 p.376)
        • When Population Variance is Known (10.3)
        • When Population Variance is Unknown (Ch. 11.2)
    iii) The p-value of a Test of Hypothesis
        • Interpreting the p-value
        • Using the p-value to Draw Conclusions
    iv) Calculating the Probability of a Type II Error (10.5)
    iii) Tests for the Difference Between Two Means (12.2) - if time permits