SD '00
PM

Introduction to probability and Statistics
MA331 (3 credits) Spring 2000
MWF 2:00 - 2:50 PM E115

Instructor: Mi-Soo Smith Office HH018 Ext. 681
Office Hour: by appointment

Textbook: Mathematical Statistics with Applications
By W. Mendenhall, D. Wackerly, R. Scheaffer
Fifth Edition, ISBN : 0-534-92026-8
PWS-KENT Publishing Company

Course Description: Sample space, random variables, classical distribution, the central limit theorem, estimation, testing of hypotheses for parameters, the first and second kinds of errors, correlations, regressions, and analysis of variance.
MA203 is recommended but not required. Offered annually. Prerequisites: MA210

Objectives: This course will introduce the students basic Statistics both in theory and application, and necessary mathematical tools in order to ensure a firm understanding of statistical theorems.

Grading Policy: Homework (30%), Quizzes and Midterms (30%) and Final Exam (40%)
Over due homeworks may not earn points.

Course Outline: The following outline is a tentative one. We may need to adjust it as needs arise.

Chapter 1. What is Statistics ? (1 week)
Key words: Relative frequency distribution, histograms, means, variances, standard deviations, empirical rule, populations, random samples, statistical inferences.
Chapter 2. Probability (skip 2.10) (3 weeks)
Key words: Review of Set Notation, Probabilistic Models, Sample Space, Events, counting techniques, conditional probability, independence of events, random events, random variables, two fundamental laws of probability, event composition methods, random variables (discrete), random sampling.
Chapter 3. Discrete Random Variables and Their probability Distributions. (skip 3.5 — 3. 10) (1 week)
Key words : Discrete probability distribution, expected values, Binomial Distribution. Tchebysheff's Theorem.
Chapter 4. Continuous Random variables and their probability distributions. (skip.4.6—4.9, 4.11) (2 weeks)
Key words: Continuous random variables, expected values , the uniform distribution, the Normal Distribution, Standardization of the variable, Tchebysheff's Theorem.
Chapter 7. Sampling Distributions and the Central Limit Theorem (skip 7.4)
(add selected topics from Chapter 5) (1 week)
Key words: Sampling distributions(of sample means, sample proportions,sample variances), t-distribution, Chi-square distribution, F-distribution, the central limit theorem, normal approximation to Binomial Distribution.
Chapter 8. Estimation (skip 8.4) (3 weeks)
Key words: Point estimators, unbiased point estimators, parameters and statistics, confidence intervals (for means, difference of means, and variances) confidence levels, selecting sample sizes.
Chapter 10. Hypothesis Testing (skip 10.9 , 10.10) (3 weeks)
Key words : Null hypotheses, alternative hypotheses, significance level, type I and type II errors, p-values, testing hypotheses.
Selected Topics : The Analysis of Variance(Ch. 13); Goodness-of-Fit test (Chi-square test), Contingency table (Ch.14) ; Regression Analysis (Ch. 11)