

The Peter F. Drucker and Masatoshi Ito Graduate School of Management
Claremont Graduate University

MGT 306 – Quantitative Methods for Management

Syllabus

Fall 2007

Tuesday 7:00 – 9:50 pm

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Office: Burkle 224

Office Hours: Tuesday 5:00 – 6:30 pm, Thursday 3:00 – 4:00 pm, and by appointment

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Course and Learning Objectives:

This course is designed to provide an introduction to statistical methods useful for analyzing data, with specific application to problems of business and economics. The methods examined, however, have general application to a wide range of data analysis. At the end of the class, students will:

- (1) understand the fundamentals of uncertainty and risk management (e.g., probability theory, covariance, portfolio risk),
- (2) know how to use methods for estimation and forecasting (e.g., measures of central tendency, simulation, regression analysis),
- (3) be able combine knowledge of risk and estimation in optimization (e.g., portfolio choice under risk aversion, profit maximization with uncertainty), and
- (4) use the tools of statistical inference (e.g., confidence intervals, hypothesis testing).

Students will also be expected to learn how to use statistics to think critically about real world issues. Statistical methodology and theory will be presented in an applications context. Ultimately, the goal is to provide students with quantitative tools that can be used in the areas of marketing, financial and managerial accounting, corporate finance, and applied operational methods.

Text:

David Anderson, Dennis Sweeney, and Thomas Williams. *Statistics for Business and Economics*, 10th edition. Thomson South-Western. ISBN 0-324-36068-1

There is no course pack for this class.

Grading:

Homework	20%
Midterm Exam	25%
Group Project	25%
Final Exam	30%

Homework:

Several homework assignments will be assigned during the course. Due dates will be given in class. The assignments will be graded on completeness, effort, and correctness. Full credit will not be given unless the work leading up to a final answer is provided. No late homework assignments will be accepted and there will be no make-up assignments. Solutions to all homework questions will be available approximately one week after the due date. The formation of study groups is encouraged, but all final answers must be the students' own work. No credit will be given for homework assignments that fail to adhere to this requirement.

Exams:

The exams are intended to test the student's understanding of the course material and the ability to apply the knowledge that has been acquired. The date for the midterm exam will be given in class. No make-up exams will be given in this course. The final exam is scheduled for **Tuesday, December 11 at 7:00 pm.**

Group Project:

During the week of **September 24**, you will form teams of three students. Each team will choose an interesting topic and submit a project proposal consisting of three unique ideas (one for each member of the group). These proposals are due on **Tuesday, October 9**. Upon approval, students will be expected to complete a statistical analysis of their topic and present their results to the class. This will take place on **Tuesday, December 4**. The length of the presentation should be 12-15 minutes; each member has 4-5 minutes to present some aspect of the project. All presentations must use PowerPoint.

The grading, in order of importance, will be based on four elements: (1) quality of the statistical analysis, (2) quality of the presentation (i.e., be prepared to speak freely; do not read off the slides or a piece of paper directly), (3) the importance, relevance, and/or imaginativeness of the topic, and (4) the appearance of the PowerPoint slides.

The PowerPoint presentations are designed to help you integrate the expertise you have acquired during the semester and exhibit it in its best light. It is my hope that using statistical techniques to study a topic you are excited about will help you remember them better.

Course Outline:

- I. Introduction: Chapters 1-3
 - A. What is Statistics
 - Statistical Problems in Business and Economics
 - Descriptive and Inferential Statistics
 - Parts of a Statistical Problem
 - B. Descriptive Statistics
 - Graphical Descriptive Methods
 - Numerical Descriptive Methods

- II. Probability Theory: Chapter 4
 - A. Introduction
 - Visual Models of Experiments
 - Simple Events
 - B. Probability Rules
 - Compound Events
 - Conditional Probabilities
 - Bayes' Theorem
 - C. Permutations and Combinations
 - Experiments with Many Elements

- III. Random Variables and Probability Distributions: Chapter 3
 - A. Introduction
 - Discrete Random Variables
 - Continuous Random Variables
 - B. Descriptive Measures
 - Expected Value
 - Variance
 - Skewness
 - C. Risk and Decision-making
 - Expected Utility
 - Utility Functions and Risk
 - Reducing Risk

- IV. Continuous Probability Distributions: Chapter 6
 - A. The Normal Distribution
 - Properties of Normal Distribution
 - Using the Normal Distribution
 - B. The Standard Normal Distribution
 - Properties of Standard Normal Distribution
 - Using the Standard Normal Distribution

- V. Sampling: Chapter 7
 - A. Population vs. Random Sample
 - Selection Bias

- Non-response Bias
- B. The Central Limit Theorem
 - Sampling Distributions
 - Simulating the Central Limit Theorem
- C. Types of Sampling
 - Stratified Random Sampling
 - Cluster Sampling
 - Quota Sampling

Midterm Exam*

- VI. Estimation: Chapter 8
 - A. Point Estimation
 - Unbiased Estimators
 - Efficient Estimators
 - B. Interval Estimation
 - Population Mean
 - Population Variance
 - Simulating the Chi-squared Distribution

- VII. Hypothesis Testing: Chapter 9
 - A. Types of Hypothesis
 - One-tailed Hypothesis Test
 - Two-Tailed Hypothesis Test
 - B. Application
 - Population Mean
 - Population Variance

- VIII. Two Sample Hypothesis Tests: Chapters 10-11
 - A. Comparing Two Population Means
 - Applications
 - Variance Assumptions
 - B. Comparing Two Population Variances
 - Applications
 - Simulating the F Distribution

- IX. Introduction to Regression Analysis: Chapter 14
 - A. Basic Model
 - Covariance and Correlation Coefficients
 - Population Regression Function
 - Sample Regression Function
 - B. Ordinary Least Squares (OLS) Estimation
 - Obtaining Parameter Estimates
 - Precision of OLS Estimates
 - C. Parameter Hypothesis Tests
 - Confidence Interval Approach

- Test of Significance Approach
- X. Multiple Regression Model: Chapter 15
 - A. Estimation and Hypothesis Testing
 - Omitted Variable Bias
 - Partial Significance
 - Overall Significance
 - Qualitative Explanatory Variables
 - B. Qualitative Dependent Variables
 - Linear Probability Model
 - Logit and Probit Model

Final Exam: Tuesday, December 11 at 7:00 pm

* Exact date will be announced in class.