

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

**MGT 306 – Quantitative Methods for Management
Syllabus**

Fall 2009

Thursdays 7:00 – 9:50 PM

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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, you will:

- (1) understand the fundamentals of uncertainty and risk management,
- (2) know how to use methods for estimation and forecasting,
- (3) be able combine knowledge of risk and estimation in optimization, and
- (4) know how to use the tools of statistical inference.

You 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 you with quantitative tools that can be used in the areas of marketing, financial and managerial accounting, corporate finance, and applied operational methods.

Text and Materials:

There is no course pack for this class.

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

You should **not** purchase the text in advance. In this course, you will use a textbook and Aplia's website (www.aplia.com). In most cases, you can save money if you buy Aplia and your text together (see payment options below). You will have access to a digital version of your text using Aplia. Additional information will be provided at the first class meeting.

Aplia Registration Instructions:

(1) First-time Aplia user...

(a) Connect to www.aplia.com

(b) Click on the New Student link and enter your Course Key, which is 46BZ-VQUE-Z545

(c) Continue following the instructions to complete your registration

(2) Returning Aplia user...

(a) Connect to www.aplia.com

(b) Sign in with your usual e-mail address and password and enter your Course Key, 46BZ-VQUE-Z545, when prompted. If you are not prompted for a new Course Key, click the Enter Course Key button to enroll in a new Aplia course. Enter your Course Key when you are prompted.

Aplia Payment Options: you will have different payment options after you register for your course. If you choose to pay later, you can use Aplia without paying until 11:59 PM on September 20th, 2009. Keep this deadline in mind if you are considering dropping the course.

(1) Option 1: digital textbook with Aplia access; purchase access to your course from Aplia's website for \$80 USD.

(2) Option 2: physical and digital textbook with Aplia access; purchase access to your course for \$80 USD and a physical book for \$75 USD from Aplia's website.

Once you have successfully registered and signed in, you will be able to access the course website. The website contains this syllabus (and any updates), class announcements, assignments, and other useful materials. It is your responsibility to check the class website regularly and to configure your e-mail properly so that you receive messages regarding this course.

Problems with Aplia? You can always e-mail Aplia by clicking on the Help link of any page or by e-mailing support@aplia.com

Grading:

Aplia Assignments	15%
Supplemental Assignments	15%
Midterm Exam	20%
Group Project	25%
Final Exam	25%

Homework:

Numerous (approximately weekly) Aplia homework assignments will be assigned during the course. These assignments are posted in the “Current Assignments” section of the class website. Graded Aplia assignments are due on the designated day and time given on the course website. Late assignments will not be accepted and will receive a grade of zero. You can change your answers as many times as you like before the due date passes (unless you choose the “grade it now” option). Once the due date passes, Aplia records your grade and you can no longer change your answers or complete the assignment. Do your assignments early to keep last minute emergencies from getting in your way. After a question is graded, Aplia can display the correct answer and explanations.

Several supplemental assignments will also be posted on the Aplia course website, but will be submitted in class (with a physical copy) and graded manually. These assignments are intended to enhance your understanding of Excel in generating graphs and producing statistical results. In addition, they may include material that was covered in class, but not adequately addressed in the text. These assignments will be graded on completeness, effort, and correctness. Again, no late homework assignments will be accepted and there will be no make-up assignments.

Exams:

The exams are intended to test your understanding of the course material and your ability to apply the knowledge you have 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 **Thursday, December 17th at 7:00 PM.**

Group Project:

By **September 24th**, you will form teams of three students. Each team will choose an interesting topic and submit a project proposal consisting of a brief description of the primary research question and the data source(s). These proposals are due on

Thursday, October 8th. Upon approval, each group will be expected to complete a statistical analysis (must include regression analysis) of their topic and present their results to the class. This will take place on **Thursday, December 3rd and Thursday, December 10th.** 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 (or equivalent).

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: **pp. 2-18**
 - Statistical Problems in Business and Economics
 - Descriptive and Inferential Statistics
 - Parts of a Statistical Problem
 - B. Descriptive Statistics: **pp. 27-43, 48-59, 82-105**
 - Graphical Descriptive Methods
 - Numerical Descriptive Methods

- II. Random Variables and Probability Distributions: Chapters 4-5
 - A. Introduction: **pp. 142-153, 187-195**
 - Discrete Random Variables
 - Continuous Random Variables
 - B. Descriptive Measures: **pp. 196-200**
 - Expected Value
 - Variance
 - Skewness
 - C. Risk and Decision-making
 - Expected Utility
 - Utility Functions and Risk
 - Reducing Risk

- III. Continuous Probability Distributions: Chapter 6
 - A. The Normal Distribution: **pp. 231-233**
 - Properties of Normal Distribution
 - Using the Normal Distribution
 - B. The Standard Normal Distribution: **pp. 233-243**
 - Properties of Standard Normal Distribution
 - Using the Standard Normal Distribution

- IV. Sampling: Chapter 7
 - A. Population vs. Random Sample: **pp. 258-267**
 - Selection Bias
 - Non-response Bias
 - B. The Central Limit Theorem: **pp. 267-280**
 - Sampling Distributions
 - Simulating the Central Limit Theorem
 - C. Types of Sampling: **pp. 288-291**
 - Stratified Random Sampling
 - Cluster Sampling
 - Quota Sampling

- V. Estimation: Chapters 7-8, 11
 - A. Point Estimation: **pp. 285-288**
 - Unbiased Estimators
 - Efficient Estimators
 - B. Interval Estimation: **pp. 300-319, 435-440**
 - Population Mean
 - Population Variance
 - Simulating the Chi-squared Distribution

MIDTERM EXAM*

- VI. Hypothesis Testing: Chapters 9, 11
 - A. Types of Hypothesis: **pp. 339-345**
 - One-tailed Hypothesis Test
 - Two-Tailed Hypothesis Test
 - B. Application: **pp. 345-365, 440-445**
 - Population Mean
 - Population Variance

- VII. Two Sample Hypothesis Tests: Chapters 10-11
 - A. Comparing Two Population Means: **pp. 394-410**
 - Applications
 - Variance Assumptions
 - B. Comparing Two Population Variances: **pp. 445-452**
 - Applications
 - Simulating the F Distribution

- VIII. Introduction to Regression Analysis: Chapters 3, 14
 - A. Basic Model: **pp. 110-119, 544-548**
 - Covariance and Correlation Coefficients
 - Population Regression Function
 - Sample Regression Function
 - B. Ordinary Least Squares (OLS) Estimation: **pp. 548-568**
 - Obtaining Parameter Estimates
 - Precision of OLS Estimates
 - C. Parameter Hypothesis Tests: **pp. 568-588**
 - Confidence Interval Approach
 - Test of Significance Approach

- IX. Multiple Regression Model: Chapter 15
- A. Estimation and Hypothesis Testing: **pp. 625-658**
 - Omitted Variable Bias
 - Partial Significance
 - Overall Significance
 - Qualitative Explanatory Variables
 - B. Qualitative Dependent Variables: **pp. 665-677**
 - Linear Probability Model
 - Logit and Probit Model

FINAL EXAM: Thursday, December 17th at 7:00 PM

* Exact date will be announced in class.