

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

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

Fall 2009

Tuesdays 4:00 – 6:50 PM

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Learning Objectives:

This course is designed to provide an introduction to quantitative analysis methods that are used heavily by industry executives in their everyday business decision support activities for analyzing data. The methods examined, however, have general application to a wide range of data analysis, including Bio-tech and Life Sciences Research, and other industries.

Most companies that are hiring MBA graduates today ask for rigorous skill-set in generating quantitative reports, analyzing them, interpreting them in light of their business, and making decisions that are supported and substantiated by such analysis. Gone are the days of vague gut-feel based decisions that used to go unquestioned. Such prowess is under thorough scrutiny by Sarbanes Oxley and other auditing practices. If you are a leader today, you need to substantiate every decision you make, every action you take. Since numbers speak objectively, it is considered to be a strong tool for making and defending your decisions.

For example, the VP of Demand Management at the packaged goods home video division of a major studio in Burbank comes with years of industry experience, as well as an MBA-level grounding of Multiple Regression methods to understand, interpret, and analyze demand data coming out of millions of Point-of-Sales data points, and generate a 'forecast' on how many DVD's are expected to sell the next day at each store of their retail customers. Based on these forecasts, she is expected to run an optimization program that determines exactly how many additional DVD's need to be replenished in each store, so that there are no stock-outs, while not accumulating excess inventory that wouldn't sell for months. This job requires a solid understanding of business statistics, optimization models, and data reports. You cannot expect to be a VP of Demand Management (or Supply Management, Accounting, Finance, Marketing, and MIS, for that matter) without a solid grounding of data-based decision support tools and systems.

This course intends to provide you a real-life oriented, hands-on introduction to the basic tools, theories, *and their applications* so that you are equipped with the language,

terms, methods, approaches, and confidence needed to deliver quality services, run businesses or provide consulting services.

In a single-semester course you are not expected to be a master in all of these areas. However, you will have a broad-based introduction to commonly used tools and methods in quantitative management. If and when you are interested in knowing more about any specific sub-discipline or topic or toolset, I will be happy to provide you guidance into advanced training opportunities.

I want to be able to personally recommend you to my clients for their announced and un-announced positions with confidence :-)

At the end of the class, you will:

- (1) understand the fundamentals of data-oriented management of today,
- (2) know how to use methods for forecasting, comparing populations,
- (3) be able combine knowledge of mathematical optimization of resources, and
- (4) know how to use the tools of statistical inference such as 'hypotheses testing'.

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. By way of side benefits, this course will also provide you with quantitative tools that can be used in the areas of marketing (MGT 321), financial and managerial accounting (MGT 326), corporate finance (MGT 335), and applied operational methods (MGT 360).

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 **Tuesday, December 8th at 4:00 PM.**

Group Project:

By **September 22nd**, 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 **Tuesday, October 6th**. 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 **Tuesday, December 1st and Tuesday, December 8th**. 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.

Additionally, it is expected that you will use such computer tools as Excel, and try to get your hands on some commercially available software with student versions such as SAS or SPSS. These are very intuitive tools and the more you get exposed to these in classroom projects, the better equipped you will be for the job market.

COURSE CALENDAR

Session	Theme and Topic(s)	Chapters	Assignment
1	Introduction: What is Quantitative Management? <ul style="list-style-type: none"> - Quantitative Problems in Business - Descriptive and Inferential Statistics - Parts of a Statistical Problem 	Chapters 1-3 pp. 2-18	
2	Everyday Descriptive Statistics: <ul style="list-style-type: none"> - Graphical Descriptive Methods - Numerical Descriptive Methods 	pp. 27-43, 48-59, 82-105	
3	What is 'Probability' and how is it used in Business? <ul style="list-style-type: none"> - Discrete Random Variables - Continuous Random Variables 	Chapters 4-5, pp. 142-153, 187-195	
4	What are the fundamental 'Parameters' of Populations? <ul style="list-style-type: none"> - Expected Value, or Expectation - Variance - Skewness 	pp. 196-200	
5	What is the 'Bell Curve' (Normal Distribution)? Some other commonly used Probability distributions: Poisson, Binomial, and Chi-Squared	Chapter 6 pp. 231-243	
6	How do I study a Huge population? - I take Samples! <ul style="list-style-type: none"> - Selection of Samples - Central Limit Theorem - Sampling Techniques 	Chapter 7 pp. 258 - 291	
7	How to Estimate the "Parameters" of the Population from my samples? <ul style="list-style-type: none"> - Point Estimation - Interval Estimation 	Chapters 7-8, 11, pp. 285-288, 300-319, 435-440	
8	MIDTERM	MIDTERM	MIDTERM
9	How do I test those Hypotheses about my Business?	Chapters 9, 11, pp. 339-345, pp. 345-365, pp. 440-445	
10	How do I compare Populations? <ul style="list-style-type: none"> - Comparing Population means and Variances 	Chapters 10-11, pp.394-410, 445-452	
11	Multiple Regression - the most popular tool for Forecasting and estimation!	Chapters 3, 14, 15 pp. 110-119, 544-568, 625-677	
12	Introduction to Mathematical Optimization - Linear and Nonlinear	Supplement to be handed out	
13	Student Project Presentations	Student Project Presentations	Student Project Presentations
14	FINAL EXAM	FINAL EXAM	FINAL EXAM