

**MBA 506  
Statistical Models for Management  
Summer 2011**

- Professor:** Dean Poeth, Ph.D., P.E., C.Mfg.E.
- Class:** Bailey 201, Monday & Wednesday 6:00-9:30 pm,  
July 25-August 29
- Office:** Graduate Center, Room 223
- Office Hours:** Monday & Wednesday 4:45-5:45.
- E-Mail:** dpoeth@nycap.rr.com
- Description:** This course emphasizes statistical approaches to support managerial decisions. Where applicable the course material is related to the Six Sigma management philosophy, finance, marketing, or health management applications. With the help of a statistical package, case studies from these areas of application are analyzed and interpreted. Setting the proper problem statement, examining the type of data required and available, analyzing these data, then drawing and discussing possible conclusions for each case are emphasized. Focus on mathematical formulas is minimized.
- Required Software:** JMP Version 8.0.2 Disks will be distributed at the first class.
- Required Text:** *JMP Means Business: Statistical Methods for Management*, J. Schmee and J.E. Oppenlander, SAS Publications, 2010. ISBN 978-1-59994-299-5.
- Resources:** The SAS Institute offers live webinars to help you get started with the JMP software at no cost. To view the schedule and register go to <http://www.jmp.com/about/events/webcasts/index.shtml>. Other JMP resources such as tutorials and demos are available on the JMP website.
- Computers with JMP software preloaded are available for student use in room 011 of the Graduate Center.
- Perquisites Courses:** MBA 502

**Course Objectives:** By completion of this course you should be able to:

- Effectively communicate the use of and results from statistical methods as applied to business problems and decision making.
- Identify certain standard problems in business and finance.
- Synthesize numerical and graphical results of statistical analysis and communicate them in written reports.
- Identify problems and analyze data that require simple comparisons of means (either two-sample, paired and ANOVA designs) as they apply to a variety of situations.
- Estimate and evaluate simple and multiple regression and time series models, especially for forecasting, to find important predictor variables (X) to change or control a response variable (Y).
- Identify problems and analyze data using measures of association to establish empirical “cause and effect.”

**Weekly Topics:**

<b><u>Class</u></b>	<b><u>Topics</u></b>	<b><u>Readings</u></b>
1	Describing Data Introduction to JMP	Chapters 1, 3 Handout – Introduction to JMP Statistical Software
2	Distributions	Chapters 5, 6
3	Single Variable Analysis	Chapters 7, 8
4	Proportions Comparing Two Means	Chapters 9, 12
5	One-way ANOVA Test 1	Chapter 10
6	Two-way ANOVA Methods for Nominal Variables	Chapters 11, 13
7	Simple Regression Analysis Simple Correlation Analysis	Chapters 14, 15 (section on correlation)
8	Multiple Regression Analysis – Part 1	Chapter 16
9	Multiple Regression Analysis – Part 2 Time Series Analysis	Chapter 17, 18 Chapters 19
10	Applying Statistical Models to Management Decisions	
11	Test 2	

**Weighting:**

Final course grades will be based on the following weighting:

Homework	20%
Test 1	20%
Test 2	25%
Case 1	15%
Case 2	15%
Class preparation/participation/quizzes	5%

**Grading Criteria:**

In this course statistical models are used to analyze data to support business decision making. Management expects the analyst to provide correct results obtained from appropriate analysis methods. In addition, the data should be thoroughly examined and summarized. The grading criteria for each assignment will follow these management expectations for quantitative analysis. Even if you do not have to analyze data in your future, you may well supervise those who do and will need to be prepared to critically evaluate their work.

**The grading criteria are:**

- Presentation quality, which includes use of correct spelling and grammar.
- Correct results
- Application and interpretation of statistical methods
- Examination and description of the data

These criteria form the essential components of a quantitative analysis, which begins with examination and description of data. The analyst must understand the data source and the quality and pedigree of the data and examine the data for potential outliers. Data is summarized by providing graphs and numerical statistics. Once a thorough understanding of the data is obtained, the correct statistical method or model that addresses the business problem is applied. The analyst should be prepared to explain the method in layman's terms (i.e., without using statistical jargon) along with any necessary assumptions and interpret the results. In business, important decisions may be influenced by the results of quantitative analysis, therefore the analyst must ensure the results are correct. Finally, the results and information must be presented clearly and concisely in the context of the business problem.

**Ungraded Problems:**

Class	Problems	Objective(s) of Assignment
1	Chapter 3 - #3, 4, 9	Use numeric and graphic statistical analysis to critically evaluate and summarize data.
2	Chapter 5 - # 4, 5 Chapter 6 - #4, 7	Apply basic probability operations and models to business problems.
3	Chapter 7 - #2, 9 Chapter 8 - #6, 8	Apply one-sample hypothesis tests and confidence intervals to business problems.
4	Chapter 12 – 2, 3 Chapter 9 – 3, 5	Apply one- and two-sample hypothesis tests and confidence intervals to business problems.
5	Chapter 10 – 3,5	Compare the means from several groups using one-way ANOVA.
6	Chapter 11 – 2, 9 Chapter 13 – 1, 2	Compare the means from several groups using two-way ANOVA. Organizing data for measuring association, measures of association, and Chi-square test for independence.
7	Chapter 14 - 3 Chapter 15 – 1	Focus on interpretation of simple regression analysis results: meaning of coefficients, recognition of poor fit and model inadequacy, outlier detection. Describe the association between continuous variables through simple correlation analysis.
8	Chapter 16 – 3	Focus on constructing and interpreting multiple regression analysis: meaning of coefficients, assessing model adequacy, multicollinearity, and importance of predictors.
9	Chapter 17 – 3, 5 Chapter 18 - 7	Create regression models containing both nominal and continuous variables. Use stepwise regression methods to obtain candidate regression equations.
10	Chapter 19 – 5, 6, 7	Apply smoothing models to time series data.

**Supplemental Information:**

Examination of data, application of statistical models and methods and the effective communication of statistical results are emphasized in this course. Written work should be clear, concise, and focused on the application of statistical methods to the business problem.

We will be using JMP extensively throughout the course. Most of the answers will rely on some computer results, both numerical and graphical. All computer packages provide you with comprehensive output; much of it is unnecessary in answering the question posed in your problem statement. Therefore select only those results that support your analysis. Do not append the totality of the output at the end; it will earn you a reduction in your grade. Incorporate the output into your answers through cutting and pasting.

**Graded Assignments** must be typed, double-spaced, Arial 11 font. All assignments are due in hardcopy and stapled at the beginning of class. No email submissions. Late assignment deduction: 10% per day. Writing quality (including spelling and grammar) as well as content will be evaluated. Assignments should follow a clearly recognizable format and structure and incorporate graphs and only relevant computer results from JMP. Assignments must be within the prescribed page limits. Students may work together on assignments, but each must turn-in a separate and original submission for grading.

**Ungraded Problems** are given to reinforce the methods and concepts presented in class and to prepare for tests and graded assignments. Problem solutions will be posted to Joule. Students are encouraged to work the problems prior to studying the solutions. The problems will be similar to those given on the tests. Time will be reserved at the beginning of each class to review and discuss the problems and solutions.

**Mid-Term and Final Exams:** These exams will cover all elements of the course, including but not limited to lectures, handouts, in-class discussions, homework assignments, and in-class projects. Tests will be approximately 45-60 minutes in length and cover important concepts and skills for each topic covered. All tests are closed book, closed notes. You will need a calculator and spare batteries.

**Laptops** are permitted for class-related work only (e.g., solving problems using JMP and class note taking). Web surfing, texting, checking email, and other non-class related activities are distracting to fellow students and are therefore prohibited except during breaks.

**Academic Integrity.** You are expected to practice academic honesty in every aspect of this course. Make sure you are familiar with the Union Graduate College Student Handbook, especially the section entitled Academic Honesty and Student Conduct Policies which begins on page 30 (<http://www.uniongraduatecollege.edu/pdf/UGCStudentHandbook.pdf>). Students who engage in academic misconduct are subject to university disciplinary procedures, as well as consequences with regard to this course.

**School of Management Grading Guidelines:**

The faculty of the School of Management has adopted the following grading guidelines. Though they are not meant to be a rigid set of rules, each professor is expected to use these guidelines in combination with his/her assessment of the students' abilities and performances to arrive at final grades.

**Grade Meaning Guidelines**

**(A)** *Exceptional* performance: Consistently displays original thinking; good organization; capacity to analyze and synthesize; superior grasp of subject matter with sound critical evaluations; evidence of extensive knowledge base.

**(A-)** Similar to A, but exhibits occasional gaps in knowledge or critical thinking skills

**(B+)** Similar to B, but on occasion, displays superior knowledge or critical thinking skills.

**(B)** *Competent* performance: evidence of grasp of subject matter; some evidence of critical capacity and analytic ability; reasonable understanding of relevant issues; evidence of familiarity with the literature.

**(B-)** Similar to B, but occasionally fails to exhibit average understanding or thinking skills and occasionally fails to produce minimally acceptable work.

**(C+)** Similar to C but with more frequent displays of competent knowledge and thinking skills.

**(C)** *Unacceptable performance*: Displays a general lack of understanding of the subject matter; frequently fails to develop solutions to simple problems in the material; often produces uninspired work that is faulty and lacking style and rigor. Without compensating higher performance in other classes, such students are generally deemed to be unfit to graduate.

**(F)** Lack of competence or willingness to complete work is evident to the point that the student should be immediately declared unfit to graduate.

**Typical Grade Distributions** It is anticipated that final grades in an average class of reasonable size (10 or more) will normally result in an average class GPA in the 3.2 – 3.7 range with grade distributions falling within the following broad limits:

Grade A or A-	30% - 60% of the class
Grades B+, B, or B-	40% - 70% of the class
Grade C+, C, or F	0 - 20% of the class