

**MBA 506
Statistical Models for Management
Spring 2009**

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- Office:** Lamont House 3rd Floor Conference Room
- Office Hours:** By appointment.
- Class:** Olin 306, Wednesday 6:25-9:45 pm
- 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 Text:** JMP Version 7.0. Download through <http://estore.e-academy.com>. Available for either PC or Mac in either 6- or 12-month licenses. This requires an “.edu” e-mail account.
- JMP Means Business: Statistical Methods for Management*, J. Schmee and J.E. Oppenlander, forthcoming, SAS Publications. (Available only at the Union College bookstore).
- Resources:** SAS Institutes 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>.
- At the back of the assignment packet you will find “Introduction to JMP Statistical Software” and “Format for a Technical Report.”
- Prerequisites 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:

<u>Date</u>	<u>Topics</u>	<u>Readings</u>
4/1	Describing Data and Distributions	Chapters 1, 3, 5, 6 Assignment Packet – Introduction to JMP Statistical Software
4/8	Distributions and Single Variable Analysis	Chapters 5, 6, 8
4/15	Single Variable Analysis	Chapters 4, 9
4/22	Comparing Two Means and One-way ANOVA	Chapters 10, 11 Assignment Packet – Format for a Technical Report
4/29	Two-way ANOVA Test 1	Chapter 12
5/6	Methods for Nominal Variables	Chapters 13, 14a
5/13	Simple Regression Analysis Simple Correlation Analysis	Chapters 15, 16 (section on correlation)
5/20	Multiple Regression Analysis – Part 1	Chapters 17, 18
5/27	Multiple Regression Analysis – Part 2 Test 2	Chapter 19
6/3	Time Series Analysis Business Application: Elasticity of Demand Business Application: Capital Market Theory Business Application: Portfolio Analysis	Chapters 20, 16, 21

Student Evaluation:

<u>Assignment</u>	<u>Due Date</u>	<u>Objective (s) of Assignment</u>
Assignment 1	4/8	Use numeric and graphic statistical analysis to critically evaluate and summarize data. Apply basic probability operations and distributions to business problems.
Assignment 2	4/15	Apply basic probability operations and models to business problems. Apply one-sample hypothesis tests and confidence intervals to business problems.
Assignment 3	4/22	Apply one- and two- sample hypothesis tests and confidence intervals to business problems.
Test 1	4/29	Covers material from weeks 1-4.
ANOVA Case	5/6	Analyze a business case and write a concise, well-organized paper incorporating graphs and numerical information, explaining statistical terminology and concepts, and interpreting results in a widely understandable style comparing means of several samples.
Assignment 4	5/13	Organizing data for measuring association, measures of association, and Chi-square test for independence.
Assignment 5	5/20	Focus on interpretation of simple regression analysis results: meaning of coefficients, recognition of poor fit and model inadequacy, outlier detection.
Test 2	5/27	Covers material from weeks 5 - 7.
Assignment 6	5/27	Focus on constructing and interpreting multiple regression analysis: meaning of coefficients, assessing model adequacy, multicollinearity, and importance of predictors.
Multiple Regression Case	6/3	Paper based on an actual data set with unclear formulation of problem including: problem statement, evaluation of adequacy of data, statistical approach and interpretation of results in clear, understandable terms.

Weighting:

Final course grades will be based on the following weighting:

Homework	30%
Tests	40%
Short Case	10%
Final Paper	20%

Supplemental Information:

Effective communication of statistical results is 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 IN 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.

Case studies need to be typed (please no e-mail submission, because they often reproduce poorly on different computers). They should follow a clearly recognizable format and structure and incorporate graphs and ONLY RELEVANT computer results from JMP. The ANOVA case should be no more than two typed pages including graphs. The multiple regression case should be 4-5 pages. **No late case studies will be accepted.**

Assignments can be submitted in a less formal way: They can be hand written, should contain (clippings of) computer output necessary to answer questions. You need to select relevant parts of the computer output. **No late assignments will be accepted.**

Tests will be approximately 45-60 minutes in length and cover important concepts and skills for each topic covered.

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