

# **MBA 7025: STATISTICAL BUSINESS ANALYSIS**

## **Spring Semester 2008**

**(Tuesday, 4:30–7:00PM, ALC 214)**

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### **1. University Catalog Description**

This course deals with the basics of converting corporate data into actionable information for managerial decision-making. Statistical data analysis techniques in the context of Business Intelligence are covered with applications in various functional areas of business. Specific techniques include data visualization, descriptive statistics, estimation, hypothesis testing, modeling relationships, basic forecasting techniques, and optimization techniques for decision support. The contextual topics focus on the implementation of six sigma methodologies for corporate performance management.

### **2. Credit Hours: 3.0**

### **3. Other Course Prerequisites: None**

### **4. Required Computer Skills Prerequisites: CSP: 1, 2, 4, 6, and 7. (Must be completed before attempting MBA7025)**

- Click <http://robinson.gsu.edu/rcbonline/csps.htm> for more details on your CSPs and for e-training.

### **5. Required Text Book and Software**

1. **“Data Analysis & Decision Making with Microsoft Excel.”** (Student CD included).  
Authors: Albright, Winston, and Zappe. Third Edition, 2006. Publisher: Thompson: South-Western. **ISBN NO: 0-324-40082-9**
2. **“The Decision Tools and StatTools Suite (Student Edition).”** Publisher:  
PALISADE/Duxbury/Thompson: South-Western. **ISBN NO: 0-534-35919-1**

### **6. Important Dates**

January	08	Classes Start
February	19	Test #1
March	03	Session Midpoint: Last day to withdraw and possibly receive a W.
March	04	No Classes--Spring Break
April	08	Test #2
April	22	Last Day of Classes
April	29	Final Exam: TUESDAY (5:00-7:00 PM)
May	13	5:00PM—Grades are scheduled by GSU to be available in GoSolar

## 7. INSTRUCTOR EVALAUTION

- Before you can view your grades, you need to complete an Instructor Evaluation for this course in Go-Solar. (You may also choose not to complete the evaluation, but you must indicate so.)
- If you need to discuss grade-related matters after the final exam, please contact me only after GSU has published your course grades in Go-Solar. (Instructor evaluation is still in progress!)

### 8a. Grading Policy/Evaluation

A. Projects:	25 Points (5 projects, each worth 5 points)
B. Tests:	75 Points
a. Test #1	25 points
b. Test #2	25 points
c. Final Exam	25 points
<b>Course Total:</b>	<b>100 pts</b>

### 8b. Letter Grade Policy

Letter Grade	Total Points:
A	93–100
A-	90-92.9
B+	87-89.9
B	83-86.9
B-	80-82.9
C+	77-79.9
C	73-76.9
C-	70-72.9
D	60-69.9
F	Below 60

### 9. Tests:

Tests will be based on the assigned readings as well as the content presented and discussed in class.

### 10. Method of Instruction:

A mix of methods will be employed including lecture, discussion, and problem-solving.

### 11. Projects:

Projects are to be completed by each individual to demonstrate his/her competency in solving the problem. *Do not submit a copy of another student's file or printouts; that will be considered plagiarism and will carry penalties.* Homework Projects must be turned in class by the designated date. No e-mails or fax transmissions will be accepted.

## **12. E-Mail Policy:**

Feel free to use e-mail to contact me, but to discuss substantive matters such as class absence, exams, or grade assignments, please contact me in person.

**13. Office Hours: TUESDAY: 3:00 - 4:00 PM** (Other times: YES, but by appointment only)

## **14. Policy on Class Attendance and Withdrawals**

- You are expected to attend all scheduled classes and take all tests
- If you miss a class, you're still responsible for catching up on the material covered in your absence before coming to the next class meeting. Arrange with your friends to obtain notes if you miss a class.
- Please consult GSU catalog and the Registrar's Office regarding university policies on Add/Drop/Withdrawal. ([http://www.gsu.edu/es/catalogs\\_courses.html](http://www.gsu.edu/es/catalogs_courses.html))
- Excessive absence: Four or more classes. Depending on the circumstances, the instructor may initiate an "involuntary" withdrawal. ([http://www.gsu.edu/es/catalogs\\_courses.html](http://www.gsu.edu/es/catalogs_courses.html))

## **15. Policy on Make-Ups**

- Home work projects are due on the dates announced in class. No late submissions.
- Tests and Finals: Do not miss them. Generally, No Exceptions.
- Requests for make-ups may be granted only under exceptional circumstances (e.g., Religious holiday, Jury Duty; proof required).
- Avoid requests for reasons of personal convenience
- Any make-up exams, if granted, must be taken prior to the next meeting of the class.
- If you miss a test without prior notice or arrangements, a grade of ZERO is automatically assigned to the missed test.

## **16. Class Discipline**

- Please arrive on time
- Do not eat food in class: Please use lounge areas.
- Cell Phones, e-mails, and other electronic devices must be turned **OFF** while in class and during tests.
- See GSU Policy on Disruptive Student Behavior. ([http://www2.gsu.edu/~wwwdos/codeofconduct\\_adminpol\\_a.html](http://www2.gsu.edu/~wwwdos/codeofconduct_adminpol_a.html))

## **COURSE DETAILS**

### **Overall Course Objectives**

Upon completion of the course, the student will be able to apply mathematical, graphical and spreadsheet modeling techniques to business situations to aid decision-making. Students will go through the process of describing data, building prediction models, using optimization techniques, and simulating key variables. Overall, the course will provide the student with an analytical foundation for dealing with business situations.

## Specific Objectives

Specifically, upon successful completion of the course, the student will learn to do the following:

### I. Exploratory Data Analysis

1. Distinguish between cross sectional and time ordered data and between univariate and multivariate data.
2. Construct and interpret a histogram.
3. Explain the role of histograms in univariate data analysis.
4. Construct and interpret a line graph.
5. Explain the role of line graphs in univariate data analysis
6. Assess if time ordered data are stationary.
7. Determine if a data set is reasonably normally distributed
8. Compute the sample mean and sample standard deviation to summarize a symmetric data set.
9. Determine when there are outliers for symmetric data.
10. Explain why outlier detection is an important managerial activity.
11. Explain the role of scatter diagrams in bivariate data analysis
12. Construct and interpret scatter diagrams.
13. Explain in plain English the meaning of the term, "best fitting line."
14. Interpret scatter diagrams that contain linear or nonlinear relationships or clusters.

### II. Statistical Estimation and Hypothesis Testing

1. Be able to develop and interpret an interval estimate of a population mean and a population proportion.
2. Be able to compute and interpret the margin of error for different levels of confidence.
3. Describe the value of the Central Limit Theorem in Statistical Inference.
4. Know the definitions of the following terms: confidence interval, confidence factor, confidence level, margin of error, and degrees of freedom.
5. Learn how to formulate and test hypotheses about a population mean and a population proportion.
6. Understand the types of errors possible when conducting a hypothesis test.
7. Know how to interpret  $p$ -values.
8. Be able to use critical values to draw hypothesis testing conclusions.
9. Know the definitions of the following terms: null hypothesis, alternative hypothesis, Type I error, Type II error, and level of significance.

### III. Multiple Regression Analysis

1. Explain how a regression model, or equation, helps managers predict, explain, and control.
2. Explain in non-technical language the sample regression coefficients and what a best fitting model means.
3. Explain the role of (or need for) the analysis of variance in answering the question, "Is a regression model worth using at all?"

4. Explain in plain English the decomposition of sum of squares, mean squares, variance ratio and p-value.
5. Use Excel's (StatPro's) multiple regression analysis to conduct an ANOVA and follow-up t Stat analysis to develop a model that minimizes the standard error of the estimate.
6. Explain the role of the standard error of the estimate in predicting values of the dependent variable and why we want to reduce it.
7. Distinguish between prediction and extrapolation and explain the dangers of extrapolation.
8. Explain when to construct a confidence interval and a prediction interval and how to interpret prediction and confidence intervals.
9. Construct approximate prediction and confidence intervals using Excel's output.
10. Detect multicollinearity and reduce its impact.
11. Explain the impact of extreme multicollinearity.
12. Explain the use (and possibly misuse) of the  $R^2$  statistic.

#### **IV. Optimization:**

1. Explain the nature of optimization modeling.
2. Be able to formulate objective functions and relevant constraints.
3. Obtain and interpret optimized results in a DSS.
4. Understand broad categories of optimization applications.
5. Relate optimization to goal seeking and sensitivity analyses.

#### **V. Model Building**

1. Explain the need for decision support models.
2. Develop decision support models in Excel using principles of good practice.
3. Draw (and explain) influence diagrams or flowcharts.
4. Validate a decision support model using three strategies.
5. Apply (and interpret) Excel's *Scenario Manager* (TopRank) to improve output variable(s).
6. Apply best and worst case scenarios and explain why this should be done.

#### **VI. Business Intelligence:**

1. Describe the Business framework for managing organizations. Use an appropriate framework to integrate various areas.
2. Define/describe each area (Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management and Business Intelligence)
3. Describe the area of Business intelligence and its role in all business applications of IT.
4. What is Data Mining? What are some applications of Data Mining?