MBA 610.11

ADVANCED BUSINESS STATISTICS

Spring 2008 Schedule:
Wednesdays, 3/19/08 to 4/30/08, 6:30 - 9:20 p.m., 128 Bryan

Dr. Richard Ehrhardt
Office: 480 Bryan
Office phone: 334-4986
Office hours: M&W 10:30-11:30 p.m., W 5:30-6:00 p.m.
E-mail address: r_ehrhardt@uncg.edu
or by appointment.
Office hours: M&W 10:30-11:30 p.m., W 5:30-6:00 p.m.
Inclement weather www.uncg.edu

PREREQUISITES MBA 600 and the Excel Workshop, or equivalent.

TEXTBOOK Albright, Winston and Zappe. Data Analysis & Decision Making with Microsoft Excel, 3rd Ed. Thomson South-Western. 2006. (ISBN 0-324-40083-7). Do NOT install @Risk. This will be used later, in MBA617.

COURSE LEARNING OBJECTIVES

1. To develop a disciplined, objective approach to quantitative analysis.
2. To improve communication skills.
3. To improve spreadsheet skills, and learn spreadsheet skills for regression analysis.
4. To understand the basics of linear regression and related statistical techniques, to implement these techniques using Microsoft Excel, and to interpret their results.

SPECIFIC LEARNING GOALS

Upon completing the course, you should be able to:

1. Use scatter plots and estimated correlation coefficients to describe the relationship between two variables in a dataset.
2. Use linear regression to find a formula that relates the value of a dependent variable to one or more independent variables in a dataset.
3. Refine a regression model to be accurate while including only the most significant variables.
4. Describe the statistical precision of a regression model by performing hypothesis tests.
5. Ascertain when the mathematical assumptions of least squares regression are not satisfied by the variables in a model.
6. Describe the most common methods of time series forecasting.
7. Compute measures that describe the accuracy of forecasting systems over time.
8. Forecast a time series using a regression-derived trend line.
9. Forecast a time series using exponential smoothing with trend and seasonal adjustments.
CLASS POLICIES

1. **Course Format.** Class will meet in 128 Bryan for lecture, demonstration, and hands-on computing exercises. Course materials can be found at the Blackboard site for the course.

2. **Take-home Projects.** A case study and a final project will be assigned and graded. The case study will be composed with a partner, while the final project will be an individual effort. The details of each assignment will be provided in class. In each case, you are to submit Excel workbooks with a separate worksheet for each part of the assignment. Send your file to the Digital Drop Box of the Blackboard site (Tools/Digital Drop Box/Send). Assignments are due on the dates listed on page 3. More guidance on the desired format is given on page 4.

3. **Grading.** Your average grade for the course depends upon: one midterm case study (30%), a course project (35%), and the final exam (35%). The midterm case study (Case 11.4 on p. 631) will be done in teams of two, and the other two assignments will be done individually. The course project is due one week after the final exam. The cut-off scores are 90 points for an A grade, 80 for a B, and 70 for a C. You may be awarded up to a letter grade above that indicated by your numerical average if your pattern of performance and class participation justify it.

3. **UNCG Academic Integrity Policy.** You are expected to be familiar with and abide by the UNCG Academic Integrity Policy. The Policy may be found at the URL

   [http://www.uncg.edu/saf/studiscp/Honor.html](http://www.uncg.edu/saf/studiscp/Honor.html)

   Although you are encouraged to discuss graded take-home assignments with classmates, you are not to share details of your work. Specifically, you are not to (1) share computer files or printed output from your computer analysis, or (2) work with another class member in composing or developing the required Excel files. Violations of the Code will result in penalties ranging from an F on the assignment to an F in the course.

**TENTATIVE CLASS SCHEDULE** (Be sure to bring your textbook and laptop to each class.)

**March 19: Class 1**

- Chapter 11, Regression Analysis: Estimating Relationships
  - Scatterplots
  - Graphing relationships between variables
  - Correlation
  - Measuring the degree of a linear relationship
  - Simple Linear Regression
  - Finding a formula to describe a linear relationship

**Prior to class,** review MBA 600 and read text sections 11.1 through 11.4. Create a folder named MBA610 within “My Documents” in your computer, and then create subfolders named CaseFiles, ExampleFiles and ProblemFiles within the MBA610 folder. Create subfolders named DataOnly and Finished within the ExampleFiles folder. Put the Student CD that comes with the text in your CD drive and copy all the files from Chapters 11, 12 and 13 into the appropriate folders that you have just created.
March 26: Class 2
   Chapter 11, Regression Analysis: Estimating Relationships
      Multiple Regression
         Including more variables in the analysis
      Modeling Possibilities
         Using regression creatively

      Prior to class, read text sections 11.5 and 11.6. Do problems 11.4 and 11.13.

April 2: Class 3
   Chapter 12, Regression Analysis: Statistical Inference
      The Statistical Model
         Mathematical formalities of regression models
      Include/Exclude Decisions
         Finding the model with the best set of variables
      Statistical Inference
         Describing the statistical precision of the model

      Prior to class, read text sections 12.1 - 3 and 12.5. Do problems 11.3 and 11.27.

April 9: Class 4 (Case Study due)
   Chapter 12, Regression Analysis: Statistical Inference
      Multicollinearity
         Identifying and correcting instabilities in the calculations
      Violations of Regression Assumptions
         Understanding when to doubt the accuracy of the results

      Prior to class, read text sections 12.4 and 12.9.

April 16: Class 5
   Chapter 13, Time Series Analysis and Forecasting
      Forecasting Methods
         An overview of methods for forecasting time series
      Regression Methods
         Using regression to forecast with a trend line
      Exponential Smoothing
         Simple smoothing without estimating trend or seasonality
         Including an estimated trend in exponential smoothing

      Prior to class, read text sections 13.1 through 13.4 and 13.8.

April 23: Class 6
   Chapter 13, Time Series Analysis and Forecasting
      Exponential Smoothing
         Including an estimated trend and seasonality in exponential smoothing

      Prior to class, read text section 13.9.

April 30: Final Exam

May 2 (Friday): Course Project due, 12:00 noon
EXAM POLICY

The exam will take an entire class period and will be closed-book, with the following exceptions: (1) you will be allowed to refer to notes on one 8½x11 sheet of paper during the exam; and (2) you will have your laptop computer at your disposal. You may use any files and features available on your laptop provided that you do not communicate with anyone during the exam.

CLASS ATTENDANCE

Regular class attendance is the best way to ensure steady and productive learning. Poor attendance will result in your forfeiting the possibility of earning a course grade higher than your term average, as described on page 1.

COMPUTER COMPETENCY

It will be assumed that you have acquired the basic skills covered in the Excel Workshop and MBA 600. Examples of the expected level of Excel skills can be found in Parts 1, 2 and 3 of the text. You will need to be sufficiently familiar with an Internet browser to obtain data, examples, and exam information from various websites.

TAKE-HOME PROJECTS: FORM AND CONTENT

A case study and a final project will be submitted for grading by the due dates listed on page 3. In each case, Excel workbooks will be transmitted to the instructor with the analysis of each problem or project part placed on a separate worksheet. Send your file to the Digital Drop Box of the Blackboard site (Tools/Digital Drop Box/Send). If the Blackboard site is unavailable, then the file may be sent via electronic mail (r_ehrhardt@uncg.edu). You may be permitted to submit an assignment up to one week late if special circumstances arise. If so, a penalty of one letter grade will be assessed, and no other late submissions will be permitted.

Your worksheets should be organized and annotated so that they readily communicate your ideas and the results of your analysis. Remember when composing your worksheets that the point of the exercise is to demonstrate to your instructor that you understand the principles and techniques being studied. Your grade will be based upon (1) how well you conduct your analysis and (2) how professionally you present your results and convey your ideas.

The analysis of each problem or project part should begin with a very brief overview of the essential elements of the analysis. This should not be a restatement of the problem or project, but rather a summary that casts the problem in terms that reveal its logical structure. The quantitative analysis should be sufficiently annotated so as to clearly communicate methods. Finally, the conclusions of the analysis should be explicitly stated. Be careful to briefly state the implications of your analysis and to answer any questions that were asked in the statement of the problem or project part.
BIOGRAPHY

Rich Ehrhardt is from New York City, and began his professional life in physics and engineering. He earned a BS in physics at The Cooper Union, in New York City, and an MS in physics at the University of Massachusetts at Amherst. He then began five years on the technical staff of the U. S. Atomic Energy Commission, during which he spent a year at the University of California at Berkeley earning an MS in nuclear engineering, and a year at Argonne National Laboratory performing safety systems research. His responsibilities at U.S.A.E.C. headquarters in Washington, DC were in the area of civilian electrical power generation, managing research and development contracts in advanced reactor systems design and nuclear reactor safety.

He returned to graduate studies in 1973, earning a Ph.D. in administrative sciences at Yale University in 1976. He was a member of the faculty of UNCCH, in the Department of Operations Research and in the School of Business, prior to joining the Bryan School faculty in 1982. His research interests are in stochastic models of operations research, materials management, and production control systems. He has consulted on materials management and project management issues with a number of firms and has lectured to executive groups. Professor Ehrhardt is a member of the Institute for Operations Research and the Management Sciences, the International Society for Inventory Research, and the Operations Management Society.