University of Southern California
MARSHALL SCHOOL OF BUSINESS
MBA.PM Winter Term 2015-2016
Syllabus

GSBA 506 A&B – APPLIED MANAGERIAL STATISTICS (LA CORE)

Instructor: Dr. Arif Ansari
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Grader: TBA
Email: TBA
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COURSE OBJECTIVES

1. Obtain skills needed to perform basic data analysis and understand analyses performed by others (e.g. consultants).
2. Use quantitative material to support written arguments.
3. Learn the appropriate statistical technique for analyzing the data.
4. Understand the multiple regression models used in Business and Model Building.
5. Meeting Term2 theme of " Increasing Awareness & Building Knowledge"

- Gaining the tools to see and uncover information for better decision making.

Why Study Statistics? Managers need strong quantitative and statistical skills in order to make sense out of the mass of data being collected in today's computerized business environment. However, being able to crunch numbers in an Excel spreadsheet is *not* enough. Managers must also be able to understand what such summaries and tabulations mean. In particular, managers must understand importance of incorporating the concepts of *variability* and *uncertainty* into any data evaluation and decision making effort. They should be able to build model for prediction, forecasting and understand models built by others.

Course Description: The course covers the basic tools and concepts of statistics as they apply to management: descriptive statistics, exploratory data analysis, statistical relationships (including correlation and regression), causation, sampling, and statistical inference (including significance tests and confidence intervals). In this context, we will cover a variety of statistical methods to analyze data.

The course is divided into two parts: GSBA 506a - explores fundamental statistical concepts, and GSBA 506b - introduces practical statistical models.

GSBA 506a - Begins with descriptive statistics and exploratory data analysis. After a brief introduction to descriptive statistics and the foundations of probability, we will see

how statistics is used for estimation and to test theories (hypothesis testing) in the face of uncertainty.

GSBA 506b - Is largely devoted to understanding and using ordinary least squares to model the relationship between two or more variables. Topics in this half of the class will include interpretation of the linear regression model, its assumptions, and what to do when the assumptions are not met. Learn model building.

MARSHALL GUIDELINES

Learning Goals

In this class, emphasis will be placed on the USC Marshall School of Business learning goals as follows:

Goal	Description	Course Emphasis
1	Our graduates will understand types of markets and key business areas and their interaction *to effectively manage different types of enterprises*	High
2	Our graduates will develop a global business perspective. They will understand how local, regional, and international markets, and economic, social and cultural issues impact business decisions *so as to anticipate new opportunities in any marketplace.*	Low
3	Our graduates will demonstrate critical thinking skills *so as to become future-oriented decision makers, problem solvers and innovators*	High
4	Our graduates will develop people and leadership skills to promote their effectiveness as *business managers and leaders*	Low
5	Our graduates will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities *and aspire to add value to society*	Low
6	Our graduates will be effective communicators *to facilitate information capture and flow in organizational, social, and intercultural contexts*	Moderate

Class Attendance & Participation: Attendance and Participation are important factors in deciding your grade and your understanding of the statistics material. **I expect you to browse through the class material before class**, browsing through the class notes help you to learn the definitions and it will enable you to better understand the class lectures. Also come prepared with questions on the topic you don't understand and I will answer the questions in class. I am also available one-on-one to answer your questions. I am always accessible by e-mail and before or after class or during office hours.

Prerequisites: In order to succeed in this course, you must be familiar with algebra at the pre-calculus level. Calculus is not required, nor is any prior knowledge of statistics assumed. For students without statistical background review the Math Camp notes.

Course Materials: The following items will be necessary for completion of reading assignments and homework.

TEXTBOOK - Please note the textbook is recommended.

GSBA-506ab, Applied Managerial Statistics	
ISBN	9780321123916
Title	Statistics for Business: Decision Making and Analysis
Author	Robert Stine and Dean Foster
Publisher	Addison-Wesley

SOFTWARE - JMP

Go to USC ITS website given below (you can also google USC JMP to get to the website)

https://itservices.usc.edu/stats/jmp/jmp-pro-12-1-update-win/

Visual Tools to learn JMP

http://www.youtube.com/user/JMPSoftwareFromSAS → This link is for introduction to JMP

http://www.jmp.com/academic/learning_library.shtml → More help on JMP software

http://www.jmp.com/about/events/ondemand/ → Advanced JMP

---------- Why JMP ----------

JMP

JMP (pronounced "jump") is statistical software made by SAS that enables users to easily explore and visualize data using a variety of tools for statistical analysis and interactive graphing.

JMP can be used for research, development, and quality control applications and includes analytics for Six Sigma® and the design of experiments.

Why use JMP?

While JMP is capable of advanced analytics, the software assumes that the user only has a very basic background in statistics. Therefore, it is an ideal statistics package for students. JMP assists the user in choosing correct analytic procedures and in interpreting results.

What if I am used to using SPSS, SAS, or Stata?

SPSS users will find **JMP's graphical "point and click"** user interface familiar and easy to use. SAS users will appreciate the advanced graphing capabilities integrated into JMP software. Stata users will also appreciate and easily adjust to using JMP.

JMP vs. SAS

SAS remains the best choice of software if you need to handle large amounts of data or want maximum flexibility in terms of programming and statistical analysis. **JMP provides a streamlined alternative for smaller jobs using the most popular types of analysis – A Managerial Tool.**

The JMP user guide explains it like this, "When you are looking for an information delivery vehicle, sometimes you need a truck that can haul anything, every day, like SAS. But if you are out for a drive to go exploring, you might find it best to drive a small car, or even a sports car like JMP."

Compared to SAS, JMP is easier to install, takes up less hard drive space, and requires less RAM. While JMP is easy to learn and helps the user learn about statistics, SAS has a steep learning curve and requires more expertise.

- *Class notes.*

Class notes for this class will be available in blackboard. You should familiarize yourself with these notes before they are covered in class. You will be using Excel and JMP software to describe and analyze data. Excel is not a good tool for Regression Analysis and JMP will be used for Regression Analysis. You will find the JMP software manual quite useful. JMP resembles a spreadsheet in some ways but has many specialized graphical features not found in Excel and its cousins; working with JMP11.0 should have some carry-over value for other courses.

The JMP Manual will be used as a reference for using the JMP software and for its descriptions and discussions of statistical concepts. *Note*: There is both a Windows and a Mac version of the software.

Grading:

Grades are determined by your homework average, your score on quiz, midterm and the final. Letter grades will be determined at the end of the course according to a curve centered on B+. Letter grades will not be given for individual assignments.

Group Project	10% (I will provide more information on the group project later, it will be in the 506b part of the class)
Inclass Quizzes	10% (In each class we will have in-class quiz)
	If you miss class, you will not be allowed to make-up the in-class quiz. I will drop one quiz score (lowest score) when I calculate the

	average score for in-class quiz. The purpose of the quiz is to reinforce the concepts learned in the previous class and/or in the current class, so sometimes the quiz will be interactive quiz and I will explain the concepts at issue and other times I expect you to do the quiz on your own.
Midterm	30%
Homework(s)	15% (10% for GSBA 506a and 5% for GSBA 506b)
Final:	35%

Note: The overall grade in 506a&b will be the overall final grade. An intermediate grade will be assigned at the end of 506a class.

Expect to be questioned on the definition of terms, your understanding of relationships between the statistical concepts, and your ability to relate the concepts to "real world" problems.

Letter grades will be determined at the end of the course according to a curve centered on B+. Letter grades will not be given for individual assignments.

Homework:

Homework assignments will be distributed electronically. Homework is individual work. Homework is extremely important to your learning the material in the class. Homework assignments may be discussed with members of your team (2 or 3 students). You have the following objectives on your homework assignments:

- Answer the question you were asked.
- Argue clearly and concisely that your answer is correct.
- Demonstrate to the TA your skill in using the statistical tools needed to arrive at your answer.

We will judge your homework assignments by how clearly you communicate and understand the material. Remember that nothing conveys clear thinking like clear writing. The definition of clear writing includes the appropriate use of and reference to computer output. If you examined certain graphs and/or statistics when arriving at your solution then include that output in your report so that the reader can follow your logic to your conclusion.

At-home practice: I will post material for at home practice, these are material taken from old exams. It will help you in the learning process.

Computer output should be clearly labeled and referred to in the text. Ideally, the output should be placed in a figure close to the textual reference. Including large sections of computer output without reference in the text is a signal to the Grader that you are not sure what is important and what is not and will likely count against your grade.

If you believe that an error has been made in the grading of your homework you may ask to have it regarded. Please be specific about the problem. If you are still concerned after this process you may come and see me.

If you do not agree with the Graders' grading, you may appeal your solution to me. Note, however, that I will review your *entire* assignment and will include in my assessment of your grade your oral arguments as well. *I am a tougher grader than the grader, so be prepared when you see me. I reserve the right to adjust your grade up or down as I see fit.*

Email: The following email protocol is required for effective administration of the class.

- **The subject part of the email should start with GSBA506, example, GSBA506 – question on today's class**.
- When you email the grader the professor should be carbon copied.
- Don't email from non-USC accounts, most of the time my spam filter will filter out your message. Try to use USC email as much as possible
- Don't expect a reply for the email on weekends; I will try my best to answer your emails in a timely manner.
- Don't send many emails one after the other, collect your thoughts and compose the email.

Review Sessions: There may be optional review sessions and one final review session. They will be informal and no new material will be covered. I will answer questions about concepts, using JMP and the assignments. The time for review sessions will be announced in class.

Academic Integrity: Academic dishonesty of any type will not be tolerated in this class. Students who find this statement ambiguous should consult the Student Conduct Code, page 83, of the USC *SCampus* handbook.

A comment about writing the assignments up individually and working in teams: You can work together in teams to discuss the problems and concepts. However, you are required to write up the assignments individually. This means that all the words in you assignments are your own, and you generate all of your own computer output and graphs.

Now, while correct solutions will have very similar or even the same computer output, no two answers should be phrased the same way. If I find two or more assignments that are highly similar, I will at a minimum give the homework a zero, and may refer the incident to the Dean. *Do not test me on this policy.*

STUDENTS WITH DISABILITIES

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 am - 5:00 pm, Monday through Friday. The phone number for DSP is 213 740-0776

Syllabus and Schedule Note: Each Class is divided into two parts, Part a & Part b

The schedule below is approximate. I expect that we will sometimes be ahead of it and sometimes behind it. Changes and administrative announcements will be made in class.

******** Pages refer to pages from the text book for Edition 1*******

Date	Topics Covered	Reading Required
Mon 11/09/15	Overview & Introduction	Class Notes
Class 1a	Descriptive Statistics	Pages 1-9
	Measure of Center, Variability	Pages 14-17, 21-23, 24
	Graphical and Numerical Summary	Pages 28-34, 38-41
Mon 11/9/15	**JMP,** Frequency Distribution	Class Notes
Class 1b	Histograms, Boxplots, Empirical rule	Pages 52-63, 64-67, 69
Mon 11/23/15	Normal Random Variables	Pages 261-276
Class 2a	Hypothesis Testing	Pages388-395, Class Notes
Mon 11/23/15	Hypothesis Testing	Class Notes
Class 2b	Type I and Type II error	Pages 331-334
	Problem Solving Session	Workbook1
Mon 11/30/15	(Home Work 1 Due)	
Class 3a	Samples	Class Notes
	Central Limit Theorem	Pages 304-314
Mon 11/30/15	Sampling Distribution	Pages 325-330
Class 3b	Problem Solving Session	Workbook1
Mon 12/7/15	Introduction to Estimation	Pages 357-369
Class 4a	Confidence Interval	
Mon 12/7/15	Test of Independence	Class Notes
Class 4b	(Home Work 2 Due)	Pages 456-461
	Problem Solving Session	Workbook1
Sat 12/12/15	Midterm Exam	8:00-9:40 A.M. (Make note of the time) No early or Make-up Midterm

Syllabus for GSBA 506b

Mon 01/11/15 Class 5a	Correlation and Covariance	Class Notes Pages 104-123 Pages 464-481
Mon 01/11/16 Class 5b	Simple Linear Regression Problem Solving Session	Pages 514-535 Workbook2
Mon 01/25/16 Class 6a	Simple Linear Regression Check Model Assumptions	Class Notes Pages 546-550
Mon 01/25/16 Class 6b	Multiple Regression (Homework 3 due) Problem Solving Session	Class Notes Pages 573-588 Workbook2
Mon 02/01/16 Class 7a	Inference /Forecasting/Co-linearity Model Selection	Class Notes Pages 605-625
Mon 02/01/16 Class 7b	Indicator variables/ Transformation of Variables Problem Solving Session	Class Notes Pages 635-654 Workbook2

Mon 02/08/16 (Home Work 4 due)
(Note: Turn in HomeWork4 (Group Project) to MBA.PM Office)

Tues 02/16/16 Final Exam (6:00-9:40 p.m.) No early or Make-up Final

**** Note: HW4 will be the group project *****

Day1	**Monday, November 09, 2015**	**Section 1.1-1.2, 2.1-2.2**
Day1	**Monday, November 09, 2015**	**Section 3.1-3.2, 3.3-3.4, 4.1-4.4**
Day2	**Monday, November 23, 2015**	**Chapter 12**
Day2	**Monday, November 23, 2015**	**Section 16.3-16.4, 14.2**
Day3	**Monday, November 30, 2015**	**Section 13.1-13.2**
Day3	**Monday, November 30, 2015**	**Section 14.1**
Day4	**Monday, December 07, 2015**	**Section 15.2-15.5**
Day4	**Monday, December 07, 2015**	**Case Testing Association**
Day5	**Monday, January 11, 2016**	**Chapter 6, Chapter 19, Chapter 21**
Day6	**Monday, January 25, 2016**	**Chapter 22.1**
Day6	**Monday, January 25, 2016**	**Chapter 23**
Day7	**Monday, February 01, 2016**	**Chapter 24**
Day7	**Monday, February 01, 2016**	**Chapter 25**

The schedule below is approximate. I expect that we will sometimes be ahead of it and sometimes behind it. Changes and administrative announcements will be made in class.

******** Pages refer to pages from the text book for Edition 2 *******

Date	Topics Covered	Reading Required
Mon 11/09/15	Overview & Introduction	Class Notes
Class 1a	Descriptive Statistics	Pages 1-9
	Measure of Center, Variability	Pages 10-14, 18-20, 21
	Graphical and Numerical Summary	Pages 26-31, 35-38
Mon 11/9/15	**JMP,** Frequency Distribution	Class Notes
Class 1b	Histograms, Boxplots, Empirical rule	Pages 49-61, 62-66, 68
Mon 11/23/15	Normal Random Variables	Pages 267-286
Class 2a	Hypothesis Testing	Pages 398-404, Class Notes
Mon 11/23/15	Hypothesis Testing	Class Notes
Class 2b	Type I and Type II error	Pages 336-338
	Problem Solving Session	Workbook1
Mon 11/30/15	(Home Work 1 Due)	
Class 3a	Samples	Class Notes
	Central Limit Theorem	Pages 310-319
Mon 11/30/15	Sampling Distribution	Pages 330-336
Class 3b	Problem Solving Session	Workbook1
Mon 12/7/15	Introduction to Estimation	Pages 363-375
Class 4a	Confidence Interval	
Mon 12/7/15	Test of Independence	Class Notes
Class 4b	(Home Work 2 Due)	Pages 479-483
	Problem Solving Session	Workbook1
Sat 12/12/15	Midterm Exam	8:00-9:40 A.M. (Make note of the time) No early or Make-up Midterm

Syllabus for GSBA 506b

Mon 01/11/15 Class 5a	Correlation and Covariance	Class Notes Pages 106-125 Pages 486-503
Mon 01/11/16 Class 5b	Simple Linear Regression Problem Solving Session	Pages 536-559 Workbook2
Mon 01/25/16 Class 6a	Simple Linear Regression Check Model Assumptions	Class Notes Pages 571-579
Mon 01/25/16 Class 6b	Multiple Regression (Homework 3 due) Problem Solving Session	Class Notes Pages 600-622 Workbook2
Mon 02/01/16 Class 7a	Inference /Forecasting/Co-linearity Model Selection	Class Notes Pages 633-654
Mon 02/01/16 Class 7b	Indicator variables/ Transformation of Variables Problem Solving Session	Class Notes Pages 664-685 Workbook2

Mon 02/08/16 (Home Work 4 due)
(Note: Turn in HomeWork4 (Group Project) to MBA.PM Office)

Tues 02/16/16 Final Exam (6:00-9:40 p.m.) No early or Make-up Final

**** Note: HW4 will be the group project *****

Day1	**Monday, November 09, 2015**	**Section 1.1-1.2, 2.1-2.2**
Day1	**Monday, November 09, 2015**	**Section 3.1-3.2, 3.3-3.4, 4.1-4.4**
Day2	**Monday, November 23, 2015**	**Chapter 12**
Day2	**Monday, November 23, 2015**	**Section 16.3-16.4, 14.2**
Day3	**Monday, November 30, 2015**	**Section 13.1-13.2**
Day3	**Monday, November 30, 2015**	**Section 14.1**
Day4	**Monday, December 07, 2015**	**Section 15.2-15.5**
Day4	**Monday, December 07, 2015**	**Case Testing Association**
Day5	**Monday, January 11, 2016**	**Chapter 6, Chapter 19, Chapter 21**
Day6	**Monday, January 25, 2016**	**Chapter 22.1**
Day6	**Monday, January 25, 2016**	**Chapter 23**
Day7	**Monday, February 01, 2016**	**Chapter 24**
Day7	**Monday, February 01, 2016**	**Chapter 25**