BUS 350  
Data and Decision Analytics  
Spring 2016

Instructor: Michael G. Miller, Ph.D.  
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Office Hours  
Tuesday and Thursday from 12:00 noon to 1:00 PM. If there is sufficient demand I will schedule 
additional office hours which will be posted to Blackboard. You do not need an appointment, just drop 
by. If you would like to meet outside of the posted times get in touch with me and we can schedule an 
appointment for a mutually agreeable time.

Class Meeting Times and Locations  
All sections meet on Tuesday and Thursday. Section 000 meets from 8:30 to 9:45 AM in GBS 331, 
section 001 meets from 10:00 to 11:15 AM in GBS 331 and section 002 meets from 2:30 to 3:45 PM in 
GBS 208.

GBS Course Description  
Introduction to statistical analysis for managerial decision making. Introduces methods of data 
description, statistical inference, statistical modeling, and statistical decision theory. Methods applied to 
practical business problems. Hands-on computer work included.

Course Objectives  
This course is about using data to make decisions. Recent years have seen an explosion of the amount of 
data available to managers. Making sense of that data has become an operational imperative. The tools 
of statistics are one of the ways managers can make sense of the data and use it to make more effective 
decisions.

In this course we will introduce the concepts of descriptive and inferential statistics and their use in 
managerial decision making. Specifically in this course we will:

- Discuss basic probability theory and its use as a basis for inferential statistics  
- Develop ability in the use of Excel for statistical analysis  
- Develop an understanding of how to ask and answer “what if”: types of questions that managers 
  need to address using statistics  
- Provide the basis for a number of other topics taught in the Goizueta Business School

We will address these topics both from a conceptual standpoint (what can the technique do for us, how 
can it help us make better decisions) and the technical standpoint (how is the technique applied, what 
steps need to be taken to arrive at an answer). Both of these standpoints are important and need to be 
understood. In particular, my experience has been that the better you know how to actually apply the 
techniques of statistics (and use Excel in all ways), the more valuable you will be to a potential employer. 
Conceptual understanding is important but you have to be able to apply your conceptual knowledge.

Course Notes and Problems  
The notes used for lecture are posted to Course Documents on Blackboard. You should download a copy of 
the pdf. These notes are the main reference material for the course. There are some gaps in the notes and 
these gaps will be filled in at class. These notes reflect pretty much everything we will do in this course.
You are free to use them as you wish but one possibility would be to use them as a baseline and add any notes of your own in the margins. You may of course take your own notes in class if you wish.

A set of problems have also been posted to Course Documents. These problems will form the basis for the quizzes to be given in this class.

**Course Textbook**

There is no required text for the course. Realizing that some students might want an additional reference, the bookstore has been asked to order copies of an optional book which is Levinson, Stephan, Krehbiel, Berenson, “Statistics for Managers”, 6th ed. You can also buy this on-line of course. There are later editions of this book which should work also; the 6th edition was chosen as you should be able to easily find it used (hence cheaper). This book is totally optional. We will not use it in the course but everything we do in this course, plus many things we will not do, are covered in this book and it will have additional examples and explanations of the material. If you are concerned about your performance in this course, especially if you feel that you are weak in this kind of subject matter, you may want to consider getting the optional textbook.

**Recitation Periods**

These will be optional hour long sessions, scheduled for evening times and run by the TAs. They are open to all students in the three sections of this course. The schedule for these sessions will be posted to Blackboard. During each session the TA running the session will present solutions to a number of sample problems. These will not be the quiz problems but will have similarities to them. Students having trouble with the material are especially encouraged to attend these sessions.

**Quizzes and Quiz Problems**

There will be 6 quizzes during the semester. These quizzes will be in class and will be approximately ½ hour each. A number of possible quiz problems are identified in the course schedule at the end of this syllabus. The specific questions on each quiz will be taken from the quiz problems listed in the course schedule. Depending on their level of difficulty there may be two, three or four problems on a quiz while you can see there are many more than that listed for each quiz in the course schedule. You will not know which specific problems will be on the quiz but they will be taken from the list of possible problems. Minor changes, identified in the section immediately before the course schedule at the end of this syllabus, may be made to the listed problems.

Please do not ask the TAs or me how to solve the quiz problems – since they will be on the quiz you need to figure them out yourself (my point, essentially, if that I am giving you a huge advantage by telling you what will be on the quiz, please do your part by figuring them out yourselves). You may of course ask about similar problems and I would be glad to help you with those. Also, the TAs will work on similar problems in the recitation sessions which again is another reason to attend those sessions if you are having trouble in the class.

Notice also that there is no homework in the course. Each of you should study the way that works best for you but one suggestion would be to think of the quiz problems as homework, work out the answers as we cover the material and review them for the quiz focusing especially on how you solved them as opposed to memorization.

**Quiz Notes and Calculators**

You are allowed to bring a 3X5 card to each of the quizzes. You may write anything you want on one side of the card and use that material in the quiz. You may bring an 8 ½ X 11 sheet of paper to the final exam. You may put any information that you want on both sides of this sheet. No other notes, books or other printed material are allowed during the quizzes or the final exam.
You are allowed to use a calculator in the quizzes and the final exam but you are not allowed to share calculators. No other electronic devices including but not limited to phones, iPods, computers, tablets, etc. are allowed during quizzes or the final exam. **Make sure you bring your calculator to quizzes and the final.** Please do not ask me to share a calculator or to use your phone as a calculator and I do not have any calculators for students to borrow.

**Course Grading**
Each of the 6 quizzes will be worth 10 percent of your grade. There will be a cumulative final that will be worth 25% of your grade. The remaining 15% of your grade will be based on class participation. The final will be given at the time set by the Registrar’s office. You must take the final at the scheduled time and exceptions to this policy are exceedingly rare. In particular, having a scheduled flight home before the date of the final is not an acceptable excuse for taking the final at a time different than the date and time scheduled by the registrar, even for an international flight.

If at any point you have questions or concerns about your grade you should see me.

**Extra Credit**
Invariably, toward the end of the semester, some students who have not done well on the quizzes will ask for extra credit. This course, like others in Goizueta, is graded on a curve. Since offering extra credit to only some students would allow those students to raise their score on the curve relative to other students, the extra credit would have to be offered to all students. Everyone would then feel obligated to do the extra work so the net effect would only be to increase the workload on all students so, as a consequence, I do not offer extra credit.

**Note on Grading**
There is often more than one way to solve a problem and any correct answers solved using a sound methodology will receive full credit. Answers that are not entirely correct will receive partial credit based on the extent to which the answer is correct. **In order to receive credit, either full or partial, you need to show your work.** This is especially important if your answer is not totally correct. If you show enough work to demonstrate that you knew how to solve the problem, and your answer is correct, you will receive full credit. If your answer is not correct the grader will be looking for what parts of your answer showed insight into the problem and what parts demonstrated a sound methodology and in this case it behooves you to be as clear and complete as possible.

**Class Participation**
Woody Allen supposedly said “showing up is 80% of life”. It may not be 80% of class participation but clearly if you don’t show up you can’t get credit for participation. An attendance sheet will be circulated each class; it is a violation of the honor code to sign someone else in or to ask someone else to sign you in – don’t do it! Excessive absence will most definitely negatively impact your grade.

Outside of showing up, your class participation grade will be helped by positive, insightful comments and questions and will be hurt by negative or disrespectful interactions or other violations of class etiquette.

**Class Etiquette**
Please turn off all laptops, tablets, iPods, cell phones, pagers and similar devices while class is in session. The only exception to this is when we are using Excel at which time you may use Excel on your laptop to follow along. Please be on time. Plan on staying for the entire class session. Arriving late, stepping out during class or leaving early are all disruptive to the class and inconsiderate of your fellow students and the instructor.

**Class Attendance:** Students are expected to attend all classes. If a student does miss class, s/he is responsible for obtaining any notes, handouts, assignment changes, or administrative notices from other
students. Missing a class will not be accepted as an excuse for late assignments or for not knowing changes in the course administrative details.

**Blackboard Learn**
We will use Blackboard extensively in this course. It is your responsibility to check the course web site on a frequent basis for special announcements, changes to the syllabus or other planned activities, recitation schedules, etc. If you have questions relating to the quizzes, the course material, assignments or to any of the course policies or procedures, please post them to the discussion boards in Blackboard. This allows everyone to see the question and answer. **Please do not post any questions relating to your personal situation on the discussion boards;** questions of a personal nature should be sent to me via e-mail or asked of me in person during office hours or before or after class.

**Accommodations**
Students with accommodations through the Office of Disability Services must get me their documentation ASAP so I can plan for their accommodations. It is the students’ responsibility to follow up with me about schedules, etc., for accommodations.

**Supporting videos**
You should be able to find on the internet various videos that further explain the material covered in class. There are some really good supporting videos on YouTube that you can watch to help you with the basic mechanics. For descriptive statistics, basic probability, random variables, sampling, confidence intervals and regression check out Khan Academy.

**Academic Honesty**
The course is governed by the Goizueta Honor Code with which all students enrolled at Goizueta must comply. If you have any questions about your responsibilities under the honor code you should see me. I take this extremely seriously and will pursue any violation of the honor code through the university’s procedures. Students found to be in violation of the honor code will receive a course grade of XF—failure due to academic dishonesty.

**Course Schedule**
The course schedule is shown on the next page. It is tentative and may change. Any changes will be posted to Blackboard. Every effort will be made to not change the dates of the course quizzes. Except where noted in the schedule, the quizzes will cover whatever material we have completed up to and including the class previous to the quiz.

The Readings column gives the sections where the material being covered can be found in the course notes and the quiz problems are from the set of problems posted to Blackboard.

**Notes on Quiz Problems**
The quiz problems will be taken from the list posted to Blackboard but slight changes may be made to the specific numbers in the problems listed for each quiz. The nature of the problems will not change but some numbers may.

Some of the quiz problems require Excel. You will not be asked to do Excel calculations in the quizzes but you may be given Excel output and asked questions about the output. So for example, if the problem requires you to do a regression, on the quiz you would not be expected to do the regression but you could be given the regression output and asked to interpret the output.

You will not be expected to do long, drawn out calculations on the quizzes but you could be asked to write out a complete expression for an answer without being required to actually solve the expression.
If you know how to do the problems (i.e., if you can actually do them yourself, not just get the solutions from someone else) these minor changes should not pose any difficulty.

### Tentative Course Schedule

<table>
<thead>
<tr>
<th>Date(s)</th>
<th>Main Topics</th>
<th>Readings</th>
<th>Quiz Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/12</td>
<td>Course introduction</td>
<td>1</td>
<td>Quiz 1 Problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>P problems: 1, 4, 5, 7, 12, 14, 15, 18</td>
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<tr>
<td>1/14, 19</td>
<td>Basic probability</td>
<td>2</td>
<td>PD problems: 3, 5, 7, 16</td>
</tr>
<tr>
<td>1/21</td>
<td>Introduction to random variables, Bernoulli and binomial random variables</td>
<td>3 through 3.2</td>
<td>Quiz 2 Problems</td>
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<td></td>
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<td>PD problems: 11, 12, 15, 17, 18, 19, 21, 22, 23</td>
</tr>
<tr>
<td>1/26</td>
<td>Quiz 1 (1/2 hour); Poisson random variables</td>
<td>3.3</td>
<td>Quiz 3 Problems</td>
</tr>
<tr>
<td>1/28, 2/2, 4</td>
<td>Introduction to continuous random variables, uniform, normal and exponential random variables</td>
<td>3.4</td>
<td>S problems: 1, 2, 4, 6, 8</td>
</tr>
<tr>
<td>2/9</td>
<td>Quiz 2 (1/2 hour); Sampling</td>
<td>4.1, 4.2</td>
<td>DS problems: 1, 10, 11, 12, 13a</td>
</tr>
<tr>
<td>2/11, 16, 18</td>
<td>Sampling distributions, organizing and graphing data</td>
<td>4.3, 5 through 5.2.2</td>
<td>Quiz 4 Problems</td>
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<td>DS problems: 2, 3, 4, 5, 8, 9, 13b</td>
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<tr>
<td>2/23</td>
<td>Quiz 3 (1/2 hour); Measures of central tendency</td>
<td>5.2.3</td>
<td>E problems: 2, 3, 13, 15</td>
</tr>
<tr>
<td>2/25, 3/1, 3</td>
<td>Measures of dispersion, correlation and covariance, point estimates, confidence interval for the mean (σ known)</td>
<td>Remainder of 5, 6 through 6.2.1</td>
<td>Quiz 5 Problems</td>
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<td>E problems: 4, 5, 7, 8, 9, 12</td>
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<tr>
<td>3/15</td>
<td>Quiz 4 (1/2 hour); Confidence interval for the mean (σ unknown)</td>
<td>6.2.2</td>
<td>HT problems: 1, 2, 3, 4, 5, 9, 10</td>
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<tr>
<td>3/17, 22, 24</td>
<td>Confidence interval for the proportion, determining sample sizes, hypothesis tests</td>
<td>Remainder of 6, 7</td>
<td>Quiz 6 Problems</td>
</tr>
<tr>
<td>3/29</td>
<td>Quiz 5 (1/2 hour); Begin simple regression</td>
<td>8 through pg 78</td>
<td>R problems: 2, 3, 5, 6</td>
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<tr>
<td>3/31, 4/ 5, 7</td>
<td>Finish simple regression, begin multiple regression</td>
<td>Pgs 79 through 84</td>
<td>Quiz 6 is the last quiz. Material after quiz 6 (i.e., multiple regression) will be covered on the final, which will be cumulative. For the final, for multiple regression, make sure you know how to do R4 and R7.</td>
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<td>4/12</td>
<td>Quiz 6 (1/2 hour - note, quiz 6 will not cover multiple regression); More multiple regression</td>
<td>8.2.1, 8.2.2</td>
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<td>4/14,19</td>
<td>Finish multiple regression</td>
<td>Remainder of 8</td>
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<tr>
<td>4/21</td>
<td>Application using most of material in course / review</td>
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