Time and Place:
All content online. Each week begins at the beginning of the day on Monday.

Professor: David W. Gerbing, Ph.D.
Office: KMC 660Q
Office Hours: by appt, usually with Google Hangouts
Class Location: Online
Class Website: D2L and content posted at http://web.pdx.edu/~gerbing/513/
Class Email: gerbing@pdx.edu
   For emails, place 513 somewhere in the subject line to route to the high priority folder.
Google Hangouts:
   https://hangouts.google.com/hangouts/_/pdx.edu/gerbing?hl=en&pli=1

Prerequisite: Successful completion of on-line tutorial.

Content: The content for the course is from the text and from the videos posted online.

Learning Objectives: The emphasis throughout this course is data competency, the ability to extract information from data and apply statistical thinking to managerial problem solving. Manual computation and formula memorization are de-emphasized.

- Summarize a distribution of values in terms of center and variability, identify the location of a value within a distribution, and graphically display the results.

- Conduct and interpret statistical inference for managerial decision making by understanding how the standard error of a statistic provides the key insight for constructing confidence intervals and hypothesis tests for (a) means, (b) mean differences, (c) correlations, and (d) regression coefficients (the latter two are covered in ISQA 514/515).

- Construct and interpret models of a response variable according to specified predictor variables that contribute to estimating the unknown value of the response variable as a conditional mean (emphasized in 514/515).

- Do all statistical analyses introduced in the course using the computer and read and interpret the resulting output.

It is possible to teach at the purely mechanical level, or what is sometimes referred to as “cookbook teaching”. More useful is an understanding of the logical and conceptual basis of an analysis. This understanding provides the manager with enhanced ability to intelligently apply the technique, to further understand the meaning of the technique as well as its inherent limitations, to better position the technique against alternative procedures and to understand which procedure to select, and to provide a more comprehensive background to pursue further learning.

**Video Chats:** Video chats are offered each Sunday at 4pm, before the weekly homework is due, plus video chat availability as needed. Use the previously specified URL, which you can bookmark. Video chats with Google Hangouts will work on any computing device with a microphone and camera from a smart phone on up. The first time you go to the URL listed at the beginning of this syllabus to enter a hangout you will be prompted for a software download. Sign-ups for video chats will be posted under People – Groups in D2L.

**Computer Software:** This course is computer platform and application agnostic. The application of any capable software package for statistical analysis is just fine. There are never any questions on any test or homework assignment about computer software. The only criterion is that the assignments, and thus the take-home test, can be completed with the chosen software.

I have developed a set of computer routines based on the application R, called lessR, that are designed to efficiently and easily, with the emphasis on easily, provide precisely the analyses needed for this course. So, in practice, most or all students use my lessR functions in the R environment to accomplish their analyses for at least some of the assignments. The combination of my lessR functions within the R environment is referred to as R/lessR, but, again, use whatever software you wish.

To learn more about the growing impact of R, read the NY Times article from 2009. Since the publication of that article now almost eight years ago, R has become even more prominent, becoming the world standard for data analysis. Also see the text material referenced and videos posted on the class website.

When you have a question in this class contact me. Regarding computer use, one advantage of using R/lessR is that all input and much of the output are readily available as straight text, so when you encounter an error, just copy and paste the relevant text into an email (or discussion forum for on-line students), and I can usually diagnose the situation very quickly and get you going. Never, ever, never, spend more than a small amount of time trying to figure out some computer issue without first contacting me to get an answer.

The recommended general strategy for statistical analysis involves both R/lessR for the primary statistical analyses and a worksheet application such as Excel or LibreOffice Calc. Use the worksheet for data entry and manipulation and perhaps some simple analyses, and then use vastly superior, and generally easier to use, R/lessR statistical capabilities for the bulk of the analyses.

**Homework:** The Final is directly and literally built from the homework problems, so the ability to do the homework problems is the key indicator of doing well on the tests. Weekly homework is posted under the relevant week listed on the home page of the course website.
Homework is considered a learning experience, and so is not graded for correctness. Full solutions are provided after each week’s homework is turned in. It is your responsibility to assess the quality of your homework from the solutions. If you have questions remaining after studying the posted solutions, make sure that those questions get answered. Consistent with this conceptualization, you can work on the homework as a group if that facilitates your learning, and turn in the homework as a group in the D2L Dropbox. Do, however, put everyone’s name on the homework as well as in the note section of the Dropbox when turned in.

Tests: The tests are to be done individually. The final consists of two parts and both parts are open book. Answer computer analysis and interpretation problems as a take-home with all class materials and the Internet available as resources, with the sole resource constraint that you work alone, not consulting other people with help answering the questions. The analysis problems on the take-home tests are close copies of the homework questions with different data sets.

The second part of the final addresses more conceptual issues with short-answer questions administered by D2L under a time limit. Class materials and outside resources can still be consulted, but the time limit requires general knowledge regarding these questions before attempting the test. The general concepts to be tested on the short-answer part of the Final are listed as part of each week’s homework assignment.

Students who do well on both parts of the Final and the homework earn an “A” in the course. In practice, students who do not achieve an “A” usually do less well on the conceptual, short-answer questions. To formalize this distinction, choose one of two grade tracks.

Track A: Take both forms of the Final and be eligible for an A in the course.

Track B: Ignore the short-answer part of the Final. Instead, just demonstrate the ability to “do” statistics on a take-home test without necessarily gaining a more in-depth conceptual understanding of the underlying principles. Maximum course grade for this track is a B.

Course Grade: Your course percentage is weighted .10 of homework and .90 of the Final. The two parts of the Final are weighted .5 each in the assessment of the grade on the Final, so each part of the Final is effectively .45 of the final course percentage. A bad grade on the short-answer part of the Final is treated as if you did not take the test, typically resulting in a grade of a B or a B+ if the take-home test is done well.

Your course percentage directly translates into a letter grade, depending on your selected track. This table lists the minimum cutoffs of your course % for each letter grade.

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<th>A</th>
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The cutoffs may be lowered to your favor, but these are the minimum guarantees.
ISQA 513 Topic Outline

These dates are assignment dates. The due date for each homework is the end of the following week, Sunday evening at 11:59pm.

**Week 0** [—] Review: Pre-Course: Descriptive Statistics

**Week 1** [01/09] Basics: Data Tables, Distributions and Computer Analysis

**Week 2** [01/16] Inference: CLT, $t$-distribution, Confidence Interval

**Week 3** [01/23] Inference: Hypothesis Test for the Mean

**Week 4** [01/30] Inference: Two-Sample Group Comparison, Experiments

**Week 5** [TBD] Short-Answer part of Final administered via D2L and Take-Home part of the Final