Course Syllabus: MSDS 6370

Course Text: Blair, E., and J. Blair. 2015. *Applied Survey Sampling*. Thousand Oaks, CA: SAGE Publications, Inc.

Prerequisites: Statistics 5371

Learning Objectives

The student will:

- Be able to define and state the advantages of probability sampling
- Be able to define a sampling distribution and describe how it relates to statistical inference for finite populations
- Be able to define and explain the various features of a complex sample design (i.e., weighting, stratification, clustering), and their function and consequences for analysis
- Be able to correctly calculate estimates of means, proportions, and totals from survey data containing complex features, along with their standard errors, using SAS
- Know when/how to carry out weighting class adjustment to mitigate non-response bias
- Be able to define a design effect, and know how to use it for sample size calculations for complex designs
- Be able to describe situations when nonprobability sampling is appropriate
- Be able to describe effects on inference of non-sampling errors
- Be able to describe examples in which non-sampled databases and probability samples can provide better results when used together
- Know what to include in a report of the results of survey research and how to evaluate the quality of the survey research of others
- Know how to keep up-to-date on new technologies in sampling and survey research

Course Coverage

The textbook will be supplemented with outside readings and additional material from lectures. The synchronous sessions will include hands-on instruction of relevant software (Excel and SAS), and will include a lab component.

Grading

Your grade will be determined according to your performance on the following:

	Points	**Weight**
Homework	130	15%
Lecture questions	130	5%
Labs and class participation	130	20%
Project	100	20%
Midterm exam	100	20%

Final exam	100	20%

Homework

Homework will be assigned in weeks 1-6 and 8-13. The assignment must be submitted electronically one hour before the live session begins. The purpose of these exercises is to give you practice on the material, and to identify areas of weakness so that they can be addressed in the live sessions.

Lecture questions
Most of the lectures have questions that must be answered as you watch the videos. These will be evaluated for completeness and effort. The purpose of these exercises is to identify areas of weakness so that they can be addressed in the live sessions.

Labs and Class Participation
Each live session will include either a lab assignment or practice problems to be completed and discussed in class. Your performance on these components will be evaluated for this portion of your final grade.

Project
You will complete one project during the term, using the skills you have learned in the course. The project is due one hour prior to the week 14 live session. The project can consist of identifying and analyzing publicly available data that has been collected according to a complex survey design, or designing, implementing, and analyzing your own survey.

Midterm and Final
Your midterm will be during class time in the 7th week of class and the final exam in the 15th week. The final exam will be comprehensive.

Deadlines
Homework must be submitted electronically and answers to the lecture questions must be completed at least 1 hour prior to the live session for that week. Late homework will be accepted with a 20% penalty per day (24 hours). If there are special circumstances (such as serious illness that incapacitates you for 48 hours prior to the deadline), then you *may* receive an extension at the discretion of the live-session instructor, *but only* if you notify him/her in advance. No credit will be given for homework after a solution is posted.

Late projects will be penalized at 25% per day.

Collaboration
Discussion, explaining things to one another, and comparing solutions are good ways to learn. Thus you are encouraged to discuss the homework with your classmates. **However, each student must write up his or her own solutions. Students who turn in identical or nearly identical homework will receive zeros on the assignment.**

The writing and data analysis of your submitted project must be entirely your own work. Projects write-ups will be checked using tools for detecting plagiarism. **Violation of this rule will result in a grade of zero for the project.**

Submission guidelines for assignments

- Your name must be at the top of the first page and on each successive page.
- Submit solutions in problem order.
- Relevant SAS code and output must be included in-line at the appropriate point using Courier New (or other fixed-width) font, in 10-point size. **Inclusion of irrelevant code or output will be penalized.**
- Any graphics from SAS must be electronically cut and pasted in-line at the appropriate point of the write-up. You can use Word to resize the graphics appropriately.
- Any mathematical notation must be provided with appropriate use of subscripts, superscripts, and symbols. Use MS Equation or another equation editor if you submit your work in Word.

Course Topics and Schedule

Week	Assigned reading (from text)	Topic
1	Chapter 1	Introduction to sampling
2	Chapters 2 and 3	Probability and nonprobability samples
3		Sampling distributions
4	Chapter 5	Stratified design
5	Chapter 4	Determining sample size
6	Chapter 6	Cluster designs
7		Midterm exam
8	Section 7.1	Preparing files for analysis
9	Section 7.3	Variance estimation
10	Section 7.2	Using auxiliary information
11		Examining relationships with survey data
12	Chapter 8	Nonprobability sampling
13		Surveys and big data
14	Chapter 9	How to continue learning and evaluating samples
15		Final exam

Best Practices for Success in This Course

Attendance. Take responsibility for your commitment. Attendance means not only being there for synchronous sessions but also participating in asynchronous work.

Citizenship. You need to be actively engaged to succeed in this class. Cell phones, texting, "Facebooking," tweeting, or leisure web browsing are prohibited in class. I consider these to be a disruption (not to mention rude).

Integrity. A lot of the graded work occurs outside of class, so I expect honesty and integrity in what you submit for evaluation. Evidence of academic dishonesty will minimally result in zeros for all involved parties, and perhaps University-level disciplinary action. Don't risk your academic career.

Humility. Don't get lost! Ask questions in class. If something isn't clear to you, it probably isn't clear to others either. Questions may arise because I haven't made a connection clear or have inadvertently left out an important point. Your question gives me a chance to explain more clearly. Don't be proud or shy.

Organization. Don't procrastinate! This is a technology-driven course. Count on your computer failing or your wireless connection breaking the night before a due date. Start early and give yourself a chance to succeed.