

STAT 6510
Survey Sampling Methods
Autumn 2016

Class Time

Monday, Wednesday, Friday
3:00-3:55pm
274 Journalism Building

Instructor

Eloise Kaizar
kaizar.1@osu.edu
221 Cockins Hall

Office Hours

Wednesdays, 4:00-4:55pm
221 Cockins Hall
(Check Carmen for updates)

1 Course Overview

Course Description

Sampling from finite populations, simple random, stratified, systematic and cluster sampling design, ratio and regression estimates, non-sampling errors, models.

Course Goals

At the end of this course, I hope that you will:

- understand different sources of errors in surveys and that probability sampling is essential to unbiased estimation of totals and averages,
- appreciate the role of probability sampling in the functioning of modern society,
- know the elements of typical sampling designs (SRS, Stratified, Cluster) and why each is advantageous,
- understand finite- and infinite-sample inference and develop the skills to make inference for population means and totals (SRS, Stratified, Cluster, Complex) based on real data,
- know and develop the skills to execute several strategies for estimating the uncertainty in typical estimators,
- understand how to and develop the skills to appropriately apply and interpret modern methods for estimating relationships among variables based on real data, and
- develop professional skills, such as working in groups, creating poster presentations, and writing professional reports.

Prerequisites

STAT 5301, or PUBH-BIO 6212, or equivalent. Students should be knowledgeable about and comfortable with discrete data distributions, expected values, variances, confidence intervals, and regression. Many of these topics are reviewed in Appendix A of the course textbook.

2 Course Materials

Textbook

Lohr, Sharon L. Sampling: Design and Analysis, second edition. Brooks/Cole; 2010.

You can purchase the text in hard copy, or as an e-book. Here is the publisher's website: <https://www.cengagebrain.com/shop/ProductDisplay?catalogId=10057&productId=490609&storeId=10151>, but I am sure you are clever enough to be a smart shopper. The text is also on reserve on campus at the 18th Ave Library. The textbook has a website where you can download datasets: http://www.cengage.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9780495105275

Other References

- Cochran, Sampling Techniques
- Scheaffer, Mendenhall and Ott, Elementary Survey Sampling
- Kish, Survey Sampling
- Hansen, Hurwitz and Madow, Sample Survey Methods and Theory
- Groves, Fowler, Couper, et al., Survey Methodology

3 Computing

We will use computing for a variety of purposes, including selecting samples and analyzing survey data. We will be using the R software, which is freely available for most operating systems (<http://www.r-project.org/>). Many students prefer to access R via RStudio (<https://www.rstudio.com/>), though this is not required. If you are not already familiar with R programming, there are a plethora of online tutorials available. I recommend getting started with swirl. This site <http://swirlstats.com/students.html> has instructions for downloading R, RShiny, and opening the swirl tutorial system. Once inside, you can learn the basics of working with R via the tutorial "R Programming: The basics of programming in R."

4 Grading and Grading Policies

Point totals

Student learning will be assessed via individual homework, midterm exams, and a final project, each of which are described in detail below. Points in the course will be distributed as follows:

Assignment	% Final Grade	Due
Individual Homework	15%	Mostly Weekly
Midterm Exam 1	25%	September 28
Midterm Exam 2	25%	November 9
Project	35%	Weekly from September 26

Late Assignments

Late assignments will not be accepted. I suggest you not wait until the very last minute in case you have technical difficulties. If you have an emergency or other unusual circumstance, please contact the instructor as soon as possible.

Grading scale

Your final course grade will be based on the percentage earned, according to the standard Ohio State grading scheme. Note that this may not match the grade reported by the Carmen system. If you have questions about your grade, please ask!

5 Individual Homework

Individual homework assignments will be due approximately weekly (exact dates noted on Carmen) and consist of a small number of exercises, short answer questions, and short data analyses. The length of these assignments will be inversely related to the weekly requirements for the class project, as described below and in the instructions on Carmen. Each homework assignment is weighted equally, regardless of length.

You should submit your homework via Carmen by the due date and time announced there. Submissions must be in a single .pdf file. However, they do not need to be typeset. Feel free to take clear photos of legible solutions written out longhand and convert these into a single .pdf file (possibly via MS Word).

While the main purpose of homework is to be sure you understand the concepts and practice the techniques, homework will also be graded. It is your job to make your homework easy to grade. Raw computer output is unacceptable; all computer output must be edited and annotated. Graphs and plots must be clearly labeled and discussed in the text of the homework. Problems that are out of order or with parts not clearly identified may not receive full credit.

Although I encourage you to work together in solving the problems, your submission should be your own and should demonstrate your personal understanding of the problems. Feel free to ask me for help after you have made an attempt to solve the problems.

6 Exams

There will be two exams for this course. Both are closed book and closed notes. You may use a single 8.5 x 11in sheet of notes (front and back) for the first exam and two sheets of notes for the second exam. You may also use a calculator, but no use of cell phones or other communication devices will be allowed.

7 Project

Overview

To solidify the concepts covered in class, you (as part of a small group) will design and conduct a high quality survey, analyze the resulting data in a statistically sound manner, and present your results via a virtual poster and a written report.

I am asking you to complete this project in small groups for several reasons. First, and perhaps least important, the project is too large for an individual to complete on their own. Second, I hope

that you will learn from each other as you discuss various choices you must make to complete the project. Third, statistics doesn't happen in a vacuum. Working as a part of a team is an essential skill that this project will help you develop. Fourth, the broad array of learning and retention benefits that result from collaborative work is well documented.

You are free to divvy up the project work in any way your group would like to, with the exception that all members must be involved in developing the project sampling plan and analyzing the data, and all members must read and approve the final report before submission. (Details of these parts are in the Project Instructions.) That is, all members of the group must be involved in the project in some way from start to finish. If you would like assistance with any aspect of your project, please contact the instructor to set up a meeting.

I realize that working as part of a group may not come naturally to many of you. Here are some resources that you might find helpful:

- Group Skills Development Pledge, by Middendorf and Dormant (http://citl.indiana.edu/misc_pages/groupSkills.php).
- Working in Groups: A Note to Faculty and a Quick Guide for Students, by Ellen Sarkisian (<http://isites.harvard.edu/fs/html/icb.topic58474/wigintro.html>)

Communication

Once groups are assigned in the fourth week of class, you can use the communication tools in Carmen to communicate with each other. Note that you can access the Carmen email tools from your usual email service only if you include that email address in your Carmen/Canvas profile.

Weekly Progress Reports

To keep you on track in your project development, beginning in the sixth week of the course, you must submit progress reports.

- Due Dates: Posted with the assignment.
- Submission: One report per group should be submitted on Carmen in a single .pdf file. Each report should include the names of all the project participants at the top of the first page.
- Content: The information I expect these reports to contain (and resulting expectations regarding the overall project) is described in detail in each assignment..
- Resubmission: Because each of these steps must be completed for a successful project, you will be asked to resubmit any unacceptable progress reports. The due date of a resubmission will be communicated at the time of the request. The grade received for that report may be affected by the resubmission.

Assessment

The project comprises 35% of your final grade. The interim reports will make up a total of 10%, the poster presentation will make up 5%, and the final report will make up the remaining 20% of your final grade.

8 Academic Integrity

Your written assignments should be your own original work. In formal assignments, you should formally cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in—but no one else should revise or rewrite your work.

In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.

All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your research look more successful than it was. The course evaluation emphasizes the methodological choices over the actual results.

The course includes many opportunities for formal collaboration with your classmates. Study groups and peer-review are encouraged, but you should only turn in work that is yours. If you're unsure about a particular situation, please feel free just to ask ahead of time.

This course includes group projects, which can be stressful for students when it comes to dividing work, taking credit, and receiving grades and feedback. I have attempted to make the guidelines for group work as clear as possible for each activity and assignment, but please let me know if your group is struggling.

Ohio State's academic integrity policy

Each student is responsible for reading and understanding the contents of the Code of Student Conduct (<http://studentlife.osu.edu/csc/>). This document describes activities, including copying colleagues' work and other forms of plagiarism, and violating exam rules, that are unacceptable behavior at the University. The University Rules (Faculty Rule 3335-5-487) mandate that I report any suspected academic misconduct to the Committee on Academic Misconduct (COAM), who will adjudicate each case. Any sanctions will be imposed by COAM, and can range from no action to expulsion from the University. I intend to obey this University Rule for this course. If you have any questions about what constitutes academic misconduct in this course, please contact me. COAM also recommends reviewing the following sites and materials:

- The Committee on Academic Misconduct web pages (<http://oaa.osu.edu/coam.html>)
- Ten Suggestions for Preserving Academic Integrity (<http://oaa.osu.edu/coamtensuggestions.html>)
- Eight Cardinal Rules of Academic Integrity (<http://www.northwestern.edu/uacc/8cards.html>)

9 Accessibility and Support

Requesting Accommodations

Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs. In addition, please contact the Office for Disability

Services to register any documented disabilities. Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 098 Baker Hall, 113 W. 12th Ave. Columbus, OH 43210; telephone 614-292-3307, VRS: 614-429-1334; General Questions: slds@osu.edu; <http://www.ods.osu.edu/>.

More resources regarding accessibility can be found here: <http://ada.osu.edu/resources/Links.htm>.

Academic and Student Support

The University provides resources and services for academic and student support. More information about these resources is here: <http://artsandsciences.osu.edu/academics/current-students/resources> and here: <http://ssc.osu.edu>.

10 Disclaimer

This document is a good faith attempt to capture my expectations for students in this course. However, there may be changes (especially dates) as the course progresses. Announcements in class and on Carmen supersede this syllabus.