Syllabus for Statistics 6287, Sample Surveys
Yang Cheng, The George Washington University
Class meets 6:10pm – 8:40pm, Thursday, Fall of 2022
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Särndal, Swensson, and Wretman’s (SSW)
Lumley’s book (TL)
SAS: http://itl.gwu.edu/itl_sas.html
R: http://www.r-project.org/ (download)

1. Thursday, September 1, 2022
   a. Survey history
   b. Introduction to Statistics 6287
   c. Introduction to sample surveys; SSW chapter 1; TL 1
   d. Sample inclusion indicators, p(s); SSW 2.1-2.5
   e. π-estimator and its properties; SSW 2.6-2.8
   f. Confidence intervals, SSW 2.11

2. Thursday, September 8, 2022
   a. π-estimator and its properties; SSW 2.6-2.8
   b. SSW 3.3; SI, simple random sampling; TL 2.1
   c. SSW 2.9 with replacement sampling
   d. SSW 2.10 design effects; TL 1.1
     http://cran.fhcrc.org/web/packages/survey/index.html ; TL 1, 2.1-2.2;
     http://www.ats.ucla.edu/stat/r/ http://cran.r-project.org/manuals.html
   f. Homework 1 due in class

3. Thursday, September 15, 2022
   a. BE, Bernoulli sampling; SSW 2.8-2.11, 3.2
   b. SY, systematic sampling; SSW 3.4
   c. PO, Poisson sampling; SSW 3.5
   d. SAS introduction: proc survey:
     http://support.sas.com/rnd/app/da/new/dasurvey.html
     http://support.sas.com/documentation/cdl/en/statug/63033/HTML/default/viewer.htm#titlepage.htm (see Procedures, Survey)
     http://www.ats.ucla.edu/stat/sas/topics/survey.htm
   e. Homework 2 due in class

4. Thursday, September 22, 2022
   a. π-ps sampling; SSW 3.6
   b. pps sampling; SSW 3.6
   c. Stratified sampling; SSW 3.7; TL 2.2, 2.6
   d. Design effects; SSW 3.8
   e. R and SAS for unequal probability sampling
   f. Homework 3 due in class

5. Thursday, September 29, 2022
   a. Exam 1 in class: material through SSW 3.8; material from lectures 1-4
   b. Cluster sampling; SSW 4.1, 4.2; TL 3.1
   c. R and SAS for single stage cluster sampling
   d. Review for Exam 1
   e. Homework 4 due in class
6. Thursday, October 6, 2022
   a. Discuss exam 1
   b. Cluster sampling, two stages, SSW 4.3; TL 3.2, 3.3
   c. R and SAS for cluster sampling
   d. Homework 5 due in class

7. Thursday, October 13, 2022
   a. Discuss exam 1
   b. Cluster sampling; SSW 4.5-4.6
   c. Cluster sampling, multiple stages; SSW 4.4
   d. R and SAS for cluster sampling
   e. Homework 6 due in class

8. Thursday, October 20, 2022
   a. Estimating a ratio; SSW 5.1, 5.6; TL 5.1
   b. Taylor linearization; SSW 5.5
   c. Bias, MSE, consistency; SSW 5.2-5.4
   d. Population mean via ratio estimation; SSW 5.7; TL 5.1
   e. Ratio estimation in R and SAS
   f. Homework 7 due in class

9. Thursday, October 27, 2022
   a. Population domain via ratio estimation; SSW 5.8; TL 2.5, 5.1
   b. Estimating variance, covariance, and regression coefficients; SSW 5.9-5.10; TL 5.2-5.3
   c. Estimating a median; SSW 5.11; TL 2.4
   d. Simulation and/or case study
   e. Homework 8 due in class

10. Thursday, November 3, 2022
    a. Exam 2 in class: material from lectures 1-9
    b. Auxiliary variables and the difference estimator; SSW 6.1-6.3
    c. Review
    d. Homework 9 due in class

11. Thursday, November 10, 2022
    a. Discuss exam 2
    b. Regression estimator; SSW 6.4-6.6
    c. Homework 10 due in class

12. Thursday, November 17, 2022
    a. Regression estimators for element designs; SSW 7; TL 5.2; TL 7
    b. Regression estimation in R and SAS
    c. Homework 11 due in class

13. Thursday, December 1, 2022
    a. Regression estimators for element designs; SSW 7; TL 5.2; TL 7
    b. Regression estimators for cluster designs; SSW 8
    c. Homework 12 due in class

14. Thursday, December 8, 2022 (Last day of class)
    a. Two-phase sampling
    b. Review for final exam

15. Thursday, December 15, 2022
    a. Final Exam