

Syllabus for Statistics 6287, Sample Surveys
Yang Cheng, The George Washington University
Class meets 6:10pm – 8:40pm, Thursday, Fall of 2022
yangcheng@gwu.edu

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
 - e. R introduction: survey package: <http://faculty.washington.edu/tlumley/survey/>
<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/rnd/app/da/stat/procedures/SurveyAnalysis.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