	STAT 410-3	Spring 2013
	Statistical Analysis of Sample Surveys	Day Course

Instructor: Dr. Steven Thompson

Prerequisite:

STAT 350.

Textbook:

Sampling, 3rd Edition (2012), by S.K. Thompson, published by John Wiley and Sons.

Calendar Description:

An introduction to the major sample survey designs and their mathematical justification. Associated statistical analyses. **Quantitative.**

Outline:

This course covers the major ideas and methods of modern survey sampling.

1. Ideas of sampling, overview of application areas. Use of the free statistical software package R to select random samples and explore sampling ideas through simulation and graphics.
2. Simple Random Sampling: Selecting random samples with and without replacement, concept of population and sampling frame, estimating means, totals, and proportions, the finite population correction factor, confidence intervals, use of the normal approximation, choosing the sample size.
3. Unequal probability sampling. How to select a sample of units with unequal selection or inclusion probabilities, unbiased estimation with unequal probability designs.
4. Stratified Random Sampling: Stratification of a population, selecting stratified random samples, advantages of stratification, gains in precision, confidence limits, optimal sample sizes, stratification after selection.
5. Ratio and Regression Estimation: Use of auxiliary information, bias, mean square error, gains in precision, confidence intervals, design versus model based approaches.
6. Cluster and systematic Sampling: Selection and estimation methods, potential advantages and disadvantages.
7. Multi-Stage Sampling: Organization of the population into units of different sizes, selection in stages, estimation.
8. Double Sampling: Multiphase sampling for ratio estimation and for stratification.
9. Selected topics in modern survey sampling. Topics of current importance such as network sampling, spatial sampling.

Grading Scheme:

Assignments – 20%
Midterm 1 – 20%
Midterm 2 – 20%
Simulation project - 20%
Grading is subject to change.

Revised November 15, 2012