**Department of Mathematics & Statistics**
**Concordia University**

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## STAT 343
Sample Survey Theory and Applications
*Winter 2017*

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**Instructor**: Dr. Debaraj Sen, Office: LB 1041-21 (SGW), Phone: 514-848-2424, Ext. 3241
E-mail: debaraj.sen@concordia.ca

**Office Hours:** Wednesdays, 11:00-12:30.

**Text:** *Sampling: Design and Analysis,* 2nd Edition, by Sharon L. Lohr, Duxbury Press (2010).

**Reference:** *Sampling Techniques*, 3rd Edition, by William G. Cochran, Wiley (1977).

**Grading** The final grade will be based on the following three components:

**Scheme:**
(a) Assignments (20%)
(b) Midterm Test (32%)
(c) Final Exam. (48%)

**NOTE: It is the Department's policy that tests missed for any reason,** *including illness,* **cannot be made up. If you miss the midterm test because of illness** *(to be confirmed by a valid medical note),* **the final exam can count for 80% of your final grade.**

**IMPORTANT:** **PLEASE NOTE THAT THERE IS NO "100% FINAL EXAM" OPTION IN THIS COURSE.**

**Notes:**
a. The midterm will take place in class on **Thursday, March 7, 2017.**
b. **Midterm test will cover until weeks 7 inclusively.**
c. There will be no make-up tests.
d. The final examination will cover everything taught in the course.
e. Assignments will be handed bi-weekly and collected in class.
f. Late assignments will not be accepted.
g. There are no supplemental privileges in this course.

| Weeks | Chapters |
|---|---|
| 1 | **Chapter 1: Introduction**<br>    Why use surveys?<br>    What is a good survey?<br>    Basic terminology for survey, sampling<br>    Sources of error |
| 2 & 3 | **Chapter 2: Simple Probability Samples**<br>    Definitions of Probability sampling<br>    Simple Random Sampling<br>    Estimation of means and totals<br>    Estimation of proportions<br>    Sampling weights<br>    Confidence Intervals<br>    Determining sample size<br>    Systematic Sampling<br>    Randomization theory results for SRS<br>    Prediction Approach for SRS<br>    Use an SRS |
| 4 & 5 | **Chapter 3: Stratified Sampling**<br>    Definition and theory<br>    Sampling weights in Stratified Random Sampling<br>    Allocation of sample to strata<br>    Defining strata<br>    Model based inference for Stratified Random Sampling<br>    Quota sampling |
| 6 & 7 | **Chapter 4: Ratio and Regression Estimation**<br>    Estimation of a ratio<br>    Ratio estimation of a mean or total<br>    Regression estimation of a mean or total<br>    Ratio estimation with Stratified Samples<br>    **Mid-Term Test** |
| 8 & 9 | **Chapter 5: Cluster Sampling with Equal probabilities**<br>    Definition and notation<br>    One-Stage Cluster Sampling<br>    Clusters of equal sizes<br>    Clusters of unequal sizes<br>    Two-stage cluster sampling<br>    Designing a Cluster Sample<br>    Systematic sampling |
| 10 & 11 | **Chapter 6: Sampling with Unequal Probabilities**<br>    One-stage sampling with replacement.<br>    Two-stage sampling with replacement.<br>    Unequal probability sampling without replacement<br>    Randomization theory results and proofs |
| 12 & 13 | **Chapter 8: Non-response & Review**<br>    Effect of non-response in samples<br>    Designing Surveys to reduce non-response errors<br>    Weighting for differential non-response<br>    Imputation for non-response<br>    Parametric models for Nonresponse |