ORIGINAL COURSE IMPLEMENTATION DATE: January 1995

REVISED COURSE IMPLEMENTATION DATE: September 2020

COURSE TO BE REVIEWED (six years after UEC approval)**:** April 2026

Course outline form version: 05/18/2018

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: STAT 350	**Number of Credits:** 3 Course credit policy (105)

Course Full Title: Survey Design and Sampling

Course Short Title:

(Transcripts only display 30 characters. Departments may recommend a short title if one is needed. If left blank, one will be assigned.)

Faculty: Faculty of Science	**Department (or program if no department):** Mathematics & Statistics

Calendar Description:

Simple random sampling, stratified, systematic and cluster sampling. Inference for averages, totals and percentages under these sampling conditions, including ratio, difference and regression estimation. Questionnaire design and estimation of population sizes (eg animal populations). Students produce reports on surveys using their own data, collected and analyzed according to course material.

Note: Students with credit for MATH 350 cannot take this course for further credit.

Prerequisites (or NONE):	One of the following: STAT 106 with a B, STAT 104 with a B+, STAT 270, or STAT 271.
Corequisites (if applicable, or NONE):	
Pre/corequisites (if applicable, or NONE):	

Antirequisite Courses *(Cannot be taken for additional credit.)*

Former course code/number: **MATH 350**

Cross-listed with:

Dual-listed with:

Equivalent course(s):

(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)

Typical Structure of Instructional Hours

Lecture/seminar hours	40
Tutorials/workshops	
Supervised laboratory hours	10
Experiential (field experience, practicum, internship, etc.)	
Supervised online activities	
Other contact hours:	
Total hours	**50**

Labs to be scheduled independent of lecture hours: ☒ No ☐ Yes

Special Topics *(Double-click on boxes to select.)*

This course is offered with different topics:

☒ No ☐ Yes *(If yes, topic will be recorded when offered.)*

Independent Study

If offered as an Independent Study course, this course may be repeated for further credit: *(If yes, topic will be recorded.)*

☒ No ☐ Yes, repeat(s) ☐ Yes, no limit

Transfer Credit

Transfer credit already exists: *(See **bctransferguide.ca**.)*

☒ No ☐ Yes

Submit outline for (re)articulation:

☐ No ☒ Yes *(If yes, fill in transfer credit form.)*

Grading System

☒ Letter Grades ☐ Credit/No Credit

Maximum enrolment (for information only): 36

Expected Frequency of Course Offerings:

Every second Fall semester

Department / Program Head or Director: Ian Affleck	**Date approved:**	November 2019
Faculty Council approval	**Date approved:**	November 29, 2019
Dean/Associate VP: Lucy Lee	**Date approved:**	November 29, 2019
Campus-Wide Consultation (CWC)	**Date of posting:**	March 20, 2020
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	April 24, 2020

Learning Outcomes:

Upon successful completion of this course, students will be able to:

1. Design a questionnaire, conduct a small survey, analyze the sample data and complete a report on the findings;
2. Estimate population means, totals and proportions in terms of confidence intervals calculated from simple random samples taken from finite populations or from infinite populations;
3. Estimate (including error bounds) population means, totals and proportions from stratified random samples, select appropriate sample sizes and allocate the sample optimally;
4. Understand and apply ratio estimators in the contexts of simple and stratified random sampling;
5. Estimate population means, totals and proportions and calculate bounds on the error of estimation in the context of cluster sampling, where cluster sizes may be equal or proportional;
6. Estimate (including error bounds) population sizes using direct sampling and inverse sampling;
7. Identify response bias, selection bias and wording problems in surveys

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion.)*

Lectures; discussions in class; use of statistical software such as Excel, Minitab, SAS and/or R in computing labs.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials *(If more space is required, download Supplemental Texts and Resource Materials form.)*

The textbook is chosen by a departmental curriculum committee. Recent texts used:

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	Scheaffer, Mendenhall, Ott and Gerow	*Elementary Survey Sampling, 7th edition*	☒	Brooks/Cole	2012
Reference					
2.	Cochran	*Sampling Techniques, 3rd edition*	☐	Wiley	
3.			☐		
4.			☐		
5.			☐		

Required Additional Supplies and Materials *(Software, hardware, tools, specialized clothing, etc.)*

Typical Evaluation Methods and Weighting

Final exam:	45%	Assignments:	10%	Field experience:	%	Portfolio:	%
Midterm exam:	15%	Project:	10%	Practicum:	%	Other: participation:	5%
Quizzes/tests:	15%	Lab work:	%	Shop work:	%	Total:	100%

Student must obtain at least 40% on the final exam in order to pass this course. The final exam is comprehensive.

Typical Course Content and Topics

Elements of the sampling problem: The design of the survey sample, sources of errors in surveys, selection bias, non-response, response bias, designing a questionnaire, planning a survey.

Simple random sampling: Variance, correction for finite populations, standard error, random sampling with replacement, estimating population means, totals and proportions, selecting samples of appropriate sizes.

Stratified random sampling: Estimating population means, totals and proportions, selecting the sample size, allocation of the sample and the optimal rule, post-stratification.

Ratio estimator: Ratio estimation in simple random sampling, selecting the sample size, ratio estimation in stratified random sampling, difference estimation, regression estimation, relative efficiency.

Systematic sampling: Methods of obtaining systematic samples, estimation of population means, totals and proportions, calculating appropriate sample sizes.

Cluster sampling: Estimating population means, totals and proportions, cluster sampling combined with stratification, cluster sampling with probabilities proportional to size.

Estimating the population size: Estimation of population sizes using direct sampling and inverse sampling.

Supplemental topics (if time allows): Two-stage cluster sampling, random-response model.