

## COURSE OUTLINE

### STAT 354: Sampling Techniques

#### General Course Information

**Pre-requisites** STAT 256, 261 or permission of the department

TWF 11:30-12:20, Mac D115, CRN 22935

**Instructor** Dr. Laura Cowen, Associate Professor

Welcome! We are fortunate to conduct our class on the traditional territories of the Lekwungen-speaking people, where the Songhees, Esquimalt, and the WSÁNEĆ peoples continue to uphold historical relationships with the land.

I am an ecological statistician in the department of Mathematics and Statistics. I was trained as a field biologist receiving a BSc from Simon Fraser University where I did extensive field research on seabirds in British Columbia and Alaska. From there I saw the light and pursued a Masters degree in Biostatistics (Mmath) at the University of Waterloo. Here I worked with an optometrist to define the astigmatism in a pre-school population. Wanting to bridge my passion of biology with my statistical knowledge, I obtained a doctoral degree in Statistics studying mark-recapture models. From there I joined the University of Victoria, continuing to work on mark-recaptures models, I collaborate with other researchers to study injection drug users, syphilis, seabirds, rock lobsters, and fish.

I have designed this course for a third year student of statistics who has an interest in how samples are obtained and how estimators of totals, means, and proportions are developed from these samples. Sampling theory diverges from statistical modelling in that here populations are usually finite and often of known size. Distributional assumptions are not used to develop estimators, rather the sampling method is used.

**Email** [lcowen@uvic.ca](mailto:lcowen@uvic.ca), email is to be used for administrative purposes only. For all other issues and especially for statistical discussions, please see me in person.

**Phone** 250-721-6152

**Office** David Turpin Building A446

#### Office Hours and Assistance

**Tuesday/Wednesday** 1:30 pm to 2:30 pm, or by appointment

#### Learning Objectives

We will cover topics from most chapters of the text. Topics may include: Probability sampling, Stratification, Regression and Ratio estimators, Cluster sampling, Horvitz-Thompson



Estimator, Unequal probability samples, Population Size estimation, Rare populations, Jackknife and Bootstrap sampling, Systematic sampling.

## Course Material and Online Resources

**Textbook** *Elementary Survey Sampling* by R.L. Scheaffer, W. Mendenhall III, R. L. Ott. and K. G. Gerow. 7<sup>th</sup> edition (2012), Brooks/Cole. Note that there are earlier editions that will probably work for the course. I cannot guarantee that the assignment questions will match with older editions. I would recommend checking with a classmate or the library and I will make it your responsibility to do so.

**Course webpage** CourseSpaces STAT 354

**Calculator** The only acceptable calculator is the Sharp Calculator with a model number starting with “EL-510R”. It may be purchased at the UVic Bookstore or elsewhere for about \$12.

## Statistical Software and Computer Labs

**Software** R, a free statistical software language is used in this course. It is on the computers in the computer labs on campus. R can be downloaded from <http://www.r-project.org/>. We will use R Studio which is a user interface to R, and we will try to introduce R Markdown, a module to write both text and R code for projects and reports. Download both RStudio and the R Markdown library for free.

## Evaluation and Grading

	Homework Assignments Approx. Bi-weekly	In-class Assignments Approx weekly	Midterm Feb. 15	Final Exam TBA
Weight	20%	10%	20%	50%

**Assignments** I will give marked homework assignments approximately every two weeks. If you work together on these assignments, I expect that collaborations are fair in that everyone in a group puts in real effort to do the problems. I forbid straightforward copying. Collaborative work can benefit all participants but ‘free-riding’ at the expense of others is unethical and ultimately unproductive.

In the interest of being fair to all individuals involved, I do not accept assignments late. The course marker typically picks up all assignments at the same time. This person is a graduate student attempting to manage their own time in terms of research, course work, and marking.

**In-class Assignments** Approximately once a week we will take some time to work collaboratively during class on questions. I will ask you to hand in 8 of these in-class



assignments for marks. I will allow you to miss handing in up-to 2 assignments without documentation. You will be marked on the best 6 of the 8 assignments.

**Exams** Exams will consist of full answer questions. Please turn off all mobile phones, PDAs, and other electronic devices, and store these electronic items, calculator covers, hats, coats, and back-packs at the front of the room during examinations (including the term test). This will allow all of the aisles to be clear of debris so that I can travel easily around the room to answer questions.

**Missing work** If you miss an exam or assignment due to illness, accident, or family affliction, you should notify me as soon as possible and provide a written request to be excused with supporting documentation. In such cases I will either set a retest (for a missed exam), or your course score will be calculated using the remaining course components with the final exam being worth no more than 60%.

**Mark Disputes** I will accept reasonable arguments in writing regarding marking disputes for 2 weeks after the item has been handed back. After this time, I will consider the recorded mark as final. I will shred all assignments and term exams that have not been picked up by the final exam.

## Policies and Ethics

**Classroom conduct** I believe my classroom should be a safe, respectful and inclusive environment for all. I will not tolerate violence, disruptive behaviour, or disrespectful comments towards anyone. Please see University Policy AC1300 and the University Calendar for more information on non-academic misconduct.

**Accessibility** Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the Centre for Accessible Learning (CAL) as soon as possible. The CAL staff are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations <http://uvic.ca/cal>. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

**Grading** Percentage scores will be converted to letter grades according to the university-wide standard table  
(Undergraduate: <http://web.uvic.ca/calendar/undergrad/info/regulations/grading.html#>). (Graduate: <http://web.uvic.ca/calendar/grad/academic-regulations/grading.html#>).

**Final Examination** Off-schedule final examinations (i.e., deferred examinations) are given only in accordance with the university policy as outlined in the Calendar. If you are unable to write a final examination due to illness, accident or family affliction, please refer to the following webpages for detailed instructions how to proceed:



Undergraduate: <http://web.uvic.ca/calendar/undergrad/info/regulations/concessions.html>  
Graduate: <http://web.uvic.ca/calendar/grad/registration/concessions.html>  
Students are **strongly advised not to make plans for travel or employment during the final examination period** as special arrangements will not be made for examinations that conflict with such plans.

**Supplemental Examinations.** The Department of Mathematics and Statistics does not award 'E' grades or offer Supplemental Examinations in any of its courses.

**Attendance** The university Calendar states 'Students are expected to attend all classes in which they are enrolled.'

Undergraduate: <http://web.uvic.ca/calendar/undergrad/info/regulations/attendance.html>

Graduate: <http://web.uvic.ca/calendar/grad/academic-regulations/attendance.html#>

Our courses are conducted on that basis. If you miss an announcement (information concerning midterms, corrections to assignment, etc.) because you did not attend class, you must accept the consequences of not having learned of the change.

**Guidelines on Religious Observances** Where classes or examinations are scheduled on the holy days of a religion, students may notify their instructors, at least two weeks in advance, of their intention to observe the holy day(s) by absenting themselves from classes or examinations. Instructors will provide reasonable opportunities for such students to make up work or missed examinations.

[State your policy on missing work. For example, how will you accommodate students who miss a midterm due to illness?]

**Academic Integrity** Academic integrity is intellectual honesty and responsibility for academic work that you submit individual or group work. It involves commitment to the values of honesty, trust, and responsibility. It is expected that students will respect these ethical values in all activities related to learning, teaching, research, and service. Therefore, plagiarism and other acts against academic integrity are serious academic offenses.

#### **The responsibility of the institution**

Instructors and academic units have the responsibility to ensure that standards of academic honesty are met. By doing so, the institution recognizes students for their hard work and assures them that other students do not have an unfair advantage through cheating on essays, exams, and projects.

#### **The responsibility of the student**

Plagiarism sometimes occurs due to a misunderstanding regarding the rules of academic integrity, but it is the responsibility of the student to know them. If you are unsure about the standards for citations or for referencing your sources, ask your instructor. Depending on the severity of the case, penalties include a warning, a failing grade, a record on the students transcript, or a suspension.

It is your responsibility to understand the University's policy on academic integrity:



Undergraduate:

<http://web.uvic.ca/calendar/undergrad/info/regulations/academic-integrity.html#>

Graduate:

<http://web.uvic.ca/calendar/grad/academic-regulations/academic-integrity.html>

**Counselling Services** If you experience personal difficulties I encourage you to make use of your free access to professional counsellors. They will help you with both personal/family issues as well as academic issues such as anxiety. Go to <http://www.coun.uvic.ca> for more information.

## How to Succeed in This Course

Find a study neighbour, read the chapters before the lecture, do the assigned questions, come to office hours, participate and ask questions during class, watch for new material and course announcements on CourseSpaces. Be curious!

## Course Schedule (Dates are approximate)

Week of	Lecture
16 Jan	In-class 1
23 Jan	In-class 2
25 Jan	Assignment 1 due by 4pm
1 Feb	In-class 3
6 Feb	In-class 4
15 Feb	Assignment 2 due by 4pm
15 Feb	<b>Midterm Exam</b>
18-22 Feb	Reading Break - No classes
28 Feb	Last day to withdraw from course
06 Mar	Assignment 3 due by 4pm
	In-class 5
13 Mar	In-class 6
20 Mar	In-class 7
27 Mar	Assignment 4 due by 4pm
3 Apr	In-class 8
5 Apr	Last day of classes, Assignment 5 due by 4pm
08 Apr	<b>Exam Period Begins</b>
22 Apr	<b>Exam Period ends</b>

