STAT 344 – SURVEY SAMPLING, Fall 2022

Covid statements: 1. <u>Masks are strongly recommended in classroom</u>. 2. Please <u>**do not**</u> come to class if you feel **sick** – in this case please attend class virtually at real time via Zoom (Zoom information is posted on Canvas). The lectures will be **in-person** and will be live streamed online via Zoom at the same time. Lecture videos <u>**will not**</u> be recorded.

Lecture date/Time/Room: MWF 2pm - 3pm, Sept 6 – Dec 7, 2022, Aquatic Ecosystems Research Laboratory 120, in-person.

Class webpage: UBC Canvas STAT344.

Instructor: Lang Wu, Professor, Department of Statistics, UBC.
    Personal webpage: *https://www.stat.ubc.ca/˜lang*
    Email: lang@stat.ubc.ca
    Office: *Earth Science Building (ESB) 3126*, 2207 Main Mall.

Office hours: Instructor and TA's will hold office hours virtually via Zoom. Please see Canvas for details.

Teaching assistants: see Canvas.

Email policy: Due to large volumes of emails the instructor receives daily, the instructor may be unable to respond individual emails on time. *Please use email for confidential and personal matters only.* Please use the online **<u>Piazza discussion board</u>** on Canvas to discuss course materials.

Text: There is no suitable textbook at this level. Therefore, the lecture notes posted on Canvas will define the course materials. Some references are listed here, which can be freely accessed online via the UBC library.

Prerequisite: STAT 200 (or similar introductory statistics course)
Co-requisite: MATH/STAT 302 (or similar introductory probability course)

Lecture format: Lecture slides will be posted on Canvas. We will fill in many details and gaps in the slides during the class. Some classes will involve *in-class activities*. The lectures will be **in-person** and will be live streamed online via Zoom at the same time. There will be no recorded lecture videos, since in-class interaction is important and some classes involve in-class activities. However, marked slides will be posted on Canvas after class.

Lab: Labs start in the second week of class, in-person. Typically, there will be a small, for-credit exercise for each group to submit online on Canvas by **11:59pm on Fridays**. You should find your own group members (3–5 students), and the group members should stay the same after week 3. Each group member should take turn to serve the group leader and clearly indicate the group members and group leader on each submitted group assignment. The lowest lab group assignment score will be dropped. Please see Canvas for more details.

Homework: Homework assignments are to be completed via the WeBWorK online homework system (access via Canvas). There will be roughly seven homework assignments, typically due on **<u>Sundays by 11:59pm</u>**. The schedules of these assignments will depend on lecture schedules which

may be adjusted throughout the term. Please see Canvas for more details. You have roughly one week to complete each WeBWorK assignment. No late homework will be accepted. No credits will be given for missing homework. The lowest Webwork assignment score will be dropped.

Group project: There will be one group project, due <u>**Sunday, November 13, by 11:59pm**</u> (upload on Canvas). The project groups need not be the same as the lab groups. Please see Canvas project description for details. It may take a lot of time to complete this project, so please start early!

Piazza discussion board: We will use the Piazza online platform (access via Canvas) to allow students, TAs, and the instructor to discuss course materials. In particular, queries about course materials should be posted to Piazza, not emailed to a TA or the instructor. Bearing in mind that the TAs and the instructor will be spending time moderating and posting to Piazza.

Announcements: Class announcements will be sent via emails. Please check your emails daily.

R software: We will use software R frequently in class/lab to illustrate the basic ideas. You will also need R to complete some WeBWorK questions and the project. If you are unfamilar with R, please learn the basics as soon as possible. There are many free R tutorials on the internet. TAs will also review R basics in the labs. R code will not be tested in the exams, but it is essential to understand the lecture/lab materials.

Exams: There will be a midterm exam and a final exam – both are **in person**. The midterm exam will be on <u>**Friday, October 28**</u>, <u>**2:00pm – 2:50pm, in West Mall Swing Space (SWNG) 221**</u> (2175 West Mall, not the classroom!). No makeup exams. If you miss a midterm with good reasons (e.g., sick), the midterm weight will be transferred to your final exam. If you miss the final exam with good reasons, you have to apply for a deferred final exam through your Faculty (e.g., Faculty of Science). Please see Canvas for more details.

Evaluation: Webwork: 10%, lab: 5%, project: 10%, midterm: 25%, final exam: 50%. The weights may be adjusted if necessary.

Lecture topics:

1. Fundamentals of random sampling and inferences about populations; review of applicable material from introductory statistics.

2. Ratio and regression estimation; estimation in domains.

3. Stratified sampling.

4. Cluster sampling.

5. Sampling weights; biased sampling.

6. Nonresponse, missing data

7. Miscellaneous topics, including panel data.

References:

- Lohr, S.L. (1999 1st ed., 2010 2nd ed.) Sampling: Design and Analysis. Duxbury Press.

- Lumley, T. (2010) Complex Surveys: A Guide to Analysis Using R. Wiley.

- Rao, P.S.R.S. (2000) Sampling methodologies with applications. Chapman & Hall.