COURSE INFORMATION

Course title:	Application of Statistics in Management		
Course code:	BABS 550	Credits:	1.5
Session, term, period:	2020W2	Class location:	Zoom
Section:	300	Class times:	8:30–4:00 Feb 7, Mar 7, Mar 14
Course duration:	Jan 18 – Feb 26, 2021	Pre-requisites:	n/a
Division:	OPLOG	Co-requisites:	n/a
Program:	PMBA		

INSTRUCTOR INFORMATION

Instructor: Greg Werker, PhD
Email: greg.werker@sauder.ubc.ca Office hours: *By appointment — please email*

ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xʷməθkʷəy̓əm (Musqueam) people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

COURSE DESCRIPTION

Data — raw quantitative and qualitative information about companies, customers, employees, or pretty much anything — is everywhere. In order to make good business decisions we must know how to utilize data. This course assumes you have a solid understanding of types of data, basic inferential methods, and ways to present data (e.g., from the MBA prep course). In this brief module we will cover several of the more common statistical models you will encounter in your careers. The goal of BABS 550 is not to teach you to be a statistician, but rather an intelligent and critical consumer of statistics. In order to do so, we will be working with data and conducting analyses while also focusing on topics such as when to trust data, what assumptions are reasonable, what a model actually does for us, and how not to be fooled by misleading conclusions.

COURSE FORMAT

This course is structured as ten topics delivered over the three days. Before each class you are required to think about and complete a related "prep" question prior to the start of class. There are several assessments to help you practice the material prior to the exam. Lectures meet via Zoom.

LEARNING OBJECTIVES

By the end of this course, students will be able to:

1. Identify which graphs and which tools/methods are appropriate for different types of data and for different situations.
2. Create clear and accurate graphical representations of data.
3. Apply basic statistical tools — including hypothesis tests, confidence intervals, and regression models — to interpret data and reach reasonable conclusions.
4. Understand the assumptions underlying various methods/models, and to recognize when assumptions are violated to the extent that a particular method is not appropriate.
5. Recognize the extent of their abilities with data utilization tools, and therefore be able to correctly judge when it is appropriate to call in an expert.

ASSESSMENTS

Summary

Component	Weight
Attendance and Polls	10%
Pre-class "prep" questions (3)	12%
Homework (2)	30%
Chart assignment (1)	8%
Exam	40%
Total	100%

Details of Assessments

Attendance and Polls:
Lectures will include a few Zoom poll questions. Each question will usually count for participation (1 mark) and for correctness (1 mark). As well, students who display repeated tardiness and/or absences may lose 0.5% for each late arrival and 1% for each missed morning or afternoon session.

Prep questions:
Each Sunday there is a brief "prep" question due at 8:30am (posted and submitted on Canvas). Prep questions must be completed individually.

Homework and Chart Assignment:
Two homework assignments and one chart assignment must be completed individually. HW will be posted at least one week prior to the due date on Canvas, and must be submitted on time to receive credit.
Note on academic integrity: You are encouraged to work with classmates to enhance your learning experience. This means you may discuss problems and solution approaches. *However, your answers must represent your own work and must be in your own words.*

Exam:
The final exam (Sunday, Mar 28) covers all material from class, lecture notes, prep questions, mini cases, and assignments. Students must take the exam at the scheduled time unless arrangements have been made with the RHL Office.

LEARNING MATERIALS

Class slides will be posted on Canvas. There is no mandatory textbook, however, an introductory statistics reference (including a section on regression) is recommended. Many such references exist; here are a few suggestions:

- Introductory statistics textbooks:
  - Sharpe NR, Berkowitz J, Velleman PF, De Veaux RD. *Business Statistics, A First Course, 2nd Canadian Edition (or any other edition).* Pearson Education Canada. 2017.

Greg's recommendation

  - Moore DS & McCabe GP. *Introduction to the Practice of Statistics (any edition)*. Freeman.
- Online textbooks:
  - Statistics at Square One, Ninth Edition, TDV Swinscow (Revised by MJ Campbell) BMJ Publ. Group 1997 http://resources.bmj.com/bmj/readers/statistics-at-square-one/
  - HyperStat Online Statistics Textbook http://davidmlane.com/hyperstat/
  - Online Statistics: An Interactive Multimedia Course of Study http://onlinestatbook.com/

Technology:
Statistical tools in Excel (Analysis Toolpak) are sufficient for most of the calculations in this class (and they're free if you have Excel). If you would like to use more powerful statistics software, some of the more popular choices are R, Stata, Minitab, or SPSS.

Mini Cases and other materials:
Several mini cases and other materials or links will be posted on Canvas.

COURSE-SPECIFIC POLICIES AND RESOURCES

Missed or late assignments, and regrading of assessments

Late submissions will not be accepted and will receive a grade of zero. Requests for regrades should be emailed to the instructor, and may result in a grade change (up or down) or the grade staying the same.

Academic Concessions

If extenuating circumstances arise, please contact the RHL Graduate School program office as early as reasonably possible, and submit an Academic Concession Request & Declaration Form https://webforms.sauder.ubc.ca/academic-concession-rhlee. If an academic concession is granted during the course, the student will be provided options by RHL, or by the instructor in consultation with RHL, per UBC's policy on Academic Concession.

POLICIES APPLICABLE TO COURSES IN THE ROBERT H. LEE GRADUATE SCHOOL

Attendance

Excepting extenuating circumstances, students are expected to attend 100% of their scheduled class hours. Absent students limit their own academic potential, and that of their classmates, and cause unnecessary disruption to the learning environment. Students missing more than 20% of the total scheduled class hours for a course (including classes held during the add/drop period) without having received an academic concession will be withdrawn from that course. Withdrawals, depending on timing, could result in a "W" or an "F" standing on the transcript.

Punctuality

Students are expected to arrive for classes and activities on time and fully prepared to engage. Students arriving later than halfway through a scheduled class will be treated as absent for that class.

Electronic Devices

During online lectures, students are not permitted to use any electronic devices other than the primary one used for attending the online lecture (e.g. laptop or desktop). Only Zoom should be open during the online lecture unless an instructor advises the use of another device or application for an in-class activity (e.g., phones for iClicker Reef). Feedback from students indicates that personal devices are the number one distraction from effective learning and participation in the online learning environment.

UNIVERSITY POLICIES AND RESOURCES

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available on the UBC Senate website at https://senate.ubc.ca/policies-resources-support-student-success.

Respect for Equity, Diversity, and Inclusion

The UBC Sauder School of Business strives to promote an intellectual community that is enhanced by diversity along various dimensions including status as a First Nation, Metis, Inuit, or Indigenous person, race, ethnicity, gender identity, sexual orientation, religion, political beliefs, social class, and/or disability. It is critical that students from diverse backgrounds and perspectives be valued in and well-served by their courses. Furthermore, the diversity that students bring to the classroom should be viewed as a resource, benefit, and source of strength for your learning experience. It is expected that all students and members of our community conduct themselves with empathy and respect for others.

Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

Academic Freedom and Students Studying from Outside Canada

During this pandemic, the shift to online learning has greatly altered teaching and studying at UBC, including changes to health and safety considerations. Keep in mind that some UBC courses might cover topics that are censored or considered illegal by non-Canadian governments. This may include, but is not limited to, human rights, representative government, defamation, obscenity, gender or sexuality, and historical or current geopolitical controversies. If you are a student living abroad, you will be subject to the laws of your local jurisdiction, and your local authorities might limit your access to course material or take punitive action against you. UBC is strongly committed to academic freedom, but has no control over foreign authorities (please visit http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,33,86,0 for an articulation of the values of the University conveyed in the Senate Statement on Academic Freedom). Thus, we recognize that students will have legitimate reason to exercise caution in studying certain subjects. If you have concerns regarding your personal situation, consider postponing taking a course with manifest risks, until you are back on campus or reach out to your academic advisor to find substitute courses. For further information and support, please visit: http://academic.ubc.ca/support-resources/freedom-expression

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ONLINE TEACHING TOOL & REQUIREMENTS

This course will be taught using Zoom for classes and office hours.

For this course, you are required to use a Zoom account during classes. If you do not have a Zoom account, you can create one here: https://zoom.us/signup. Note: creating a Zoom account requires that you provide a first name, last name, and email address to Zoom. For privacy purposes, you may consent to using your

existing email address and your real name. Alternatively, if you prefer, you may sign up using an alternative email address and an anonymized name that does not identify you (i.e. Jane Doe, jane.doe@email.com). If you have trouble creating an account, or accessing a Zoom session, please contact CLCHelp@sauder.ubc.ca. You will be required to provide the email address associated with your Zoom account in a Canvas quiz for identification purposes.

To help replicate the classroom experience, make sessions more dynamic and hold each person accountable, both students and instructors are required to have their cameras on during Zoom sessions. Students who require an accommodation with regard to the "camera on" requirement must contact their instructors in advance of the first class to discuss options. As professional graduate students, students are expected to conduct themselves professionally by joining sessions on time, muting mics when not speaking, refraining from using any other technology when in-session, attending in business casual dress (at a minimum), and participating from a quiet environment. Content from synchronous sessions will be selectively recorded per instructor discretion and made available to students on Canvas for a maximum duration of the course length. This is done to allow students the opportunity to return to lecture content to solidify learnings.

COURSE SCHEDULE

(Subject to change with class consultation)

Topic	Date	Topic Description	Readings or Activities	Assessments due
1	Feb 7	**Introduction** What is Statistics? Data sources, sample size, hypothesis tests, P-value, evidence. One-sample z-test.	Read: The Brinery	**Q1** due at 8:30am
2		**Confidence Intervals**: The problem with p-values, confidence intervals, relation to hypothesis tests, examples. Normal distribution, central limit theorem (CLT).		
3		**Hypothesis Tests**: What is a hypothesis. Two sample z-tests and confidence intervals. One sample t-test; normal distribution vs. t-distribution.		
4		**Comparison of Means**: Data sources, sample size, t-tests and one-way ANOVA, assumptions, and conclusions.		**HW1** due Sunday, Feb 14, at 11:00pm
5	Mar 7	**Categorical Data**: Chi-square Tests, counts, joint and marginal distributions, hypothesis tests with no corresponding interval.		**Q2** due at 8:30am
6		**Simple Linear Regression**: Observational data; association, correlation, & causation; residuals, assumptions; transformations.		
7		**Multiple Regression**: Hypotheses; parsimony, multicollinearity, comparing models; hypothesis tests; variable selection.		**Chart assignment** due Saturday, Mar 13, at 11:00pm
8	Mar 14	**More Regression**: Outliers, leverage, influential points; higher order terms & dummy variables; logistic regression. Regression practice cases. Also paired t-test.		**Q3** due at 8:30am
9		**Putting your Statistics Skills to Use:** Model assumptions, ethics, when to hire a statistician, time series data, drawing a picture.		
10		**Review and Practice:** Review problems, practice, questions & answers.		**HW2** due Sunday, Mar 21, at 11:00pm