

COURSE INFORMATION

Course title:	Application of Statistics in Management		
Course code:	BABS 550	Credits:	1.5
Session, term, period:	2019P1		
Sections, times:	001 Tue/Thu 10am – 12pm	HA133	
	002 Tue/Thu 8am – 10am	HA132	
Course duration:	Sep 3 – Oct 11, 2019	Pre-requisites:	N/A
Division:	Operations	Co-requisites:	N/A
Program:	MBA		

INSTRUCTOR INFORMATION

Instructor:	Greg Werker, PhD		
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Email:	greg.werker@sauder.ubc.ca	Office hours:	<i>by appointment</i>

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 lectures. Most lectures require you to think about and complete a related “prep” question prior to the class. There are several assessments to help you practice the material prior to the exam.

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

<u>Component</u>	<u>Weight</u>
Class Participation	10%
Pre-class “prep” questions (6)	12%
Homework (2)	30%
Chart assignment (1)	8%
Exam	<u>40%</u>
Total	<u>100%</u>

Details of Assessments

Class participation:

After each of the ten classes you will assign yourself a score as follows:

- 0 = Absent.
- 0.5 = Arrived late and/or returned late after the break. Or on time, but not really paying attention.
- 1.0 = On time and actively participating.

These six scores will be combined to form your class participation grade; this grade may be adjusted up or down at the discretion of the instructor in extreme cases.

Prep questions:

A number of classes have a brief “prep” question due at 8:00am (posted and submitted on Canvas). Prep questions must be completed individually.

Homework and Chart Assignment:

Two homework assignments must be completed individually... while it is ok to discuss the HW with classmates, solutions must be entirely your own work. HW will be posted at least one week prior to the due date on Canvas, and must be submitted on time to receive credit.

- HW1 — *due Sunday, Sep 15, by 11pm.*
- Chart assignment — *due Sunday, Sep 29, by 11pm.*
- HW2 — *due Saturday, Oct 5, by 11pm.*

Exam:

The final exam (date/time TBD) 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

My notes 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/>
- Regression (more advanced):
 - Kutner M, Nachtsheim C, Neter J, Li W. *Applied Linear Statistical Models*. McGraw-Hill 2004.



Technology:

Statistical tools in Excel — Analysis Toolpak (Windows / Mac) or Statplus LE (Mac) — 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.

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) <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. Late arrivals may be refused entry at the discretion of the instructor or activity lead. Students arriving later than halfway through a scheduled class will be treated as absent for that class.

Electronic Devices

Devices such as laptops, tablets, and cell phones are not permitted to be used in class unless directed by the instructor for in-class activities. Students who do not follow the School's policy in this regard may be required to leave the room for the remainder of the class, so that they do not distract others. Research shows that students' use of laptops in class has negative implications for the learning environment, including reducing their own grades and the grades of those sitting around them.

Citation Style

Please use the American Psychological Association (APA) reference style to cite your sources.

Details of the above policies and other RHL Policies are available at:

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,199,506,1625>

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>.

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.

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All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the instructor or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline. Audio or video recording of classes are not permitted without the prior approval of the Instructor.

ACKNOWLEDGEMENT

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

COURSE SCHEDULE

(Subject to change with class consultation)

Class	Date	Topic	Readings or Activities	Assessments due
1	Sep 4	Introduction What is Statistics? Data sources, sample size, hypothesis tests, P-value, evidence. One-sample z-test.	Read: The Brinery: Intro, I, and II	Q1 due at 8:00am
2	Sep 6	Confidence Intervals: The problem with p-values, confidence intervals, relation to hypothesis tests, examples. Normal distribution and central limit theorem (CLT).	Read: The Brinery III	Q2 due at 8:00am
3	Sep 11	Hypothesis Tests: What is a hypothesis. Two sample z-tests and confidence intervals. One sample t-test; normal distribution vs. t-distribution.	Read: The Brinery IV, V	Q3 due at 8:00am
4	Sep 13	Comparison of Means: Data sources, sample size, t-tests and one-way ANOVA, assumptions, and conclusions.	Read: The Brinery VI	HW1 due Sunday, Sep 15, at 11:00pm
5	Sep 18	Categorical Data: Chi-square Tests, counts, joint and marginal distributions, hypothesis tests with no corresponding interval. Also Data Reduction techniques... factor analysis, cluster analysis. Experimental vs Observational data.		Q4 due at 8:00am
6	Sep 20	Simple Linear Regression: Observational data; association, correlation, & causation; residuals, assumptions; transformations.		Q5 due at 8:00am
7	Sep 25	Multiple Regression: Hypotheses; parsimony, multicollinearity, comparing models; hypothesis tests; variable selection.		Q6 due at 8:00am
8	Sep 27	More Regression: Outliers, leverage, influential points; higher order terms & dummy variables; logistic regression. Regression practice cases. Also paired t-test.		Chart assignment due Sunday, Sep 29, at 11:00pm
9	Oct 2	Advanced topics: Various topics possibly including prediction algorithms, neural networks, machine learning, and the role of humans in tweaking these methods.	Read: Who Controls your Facebook Feed	
10	Oct 4	Putting your statistics skills to use: Model assumptions, ethics, when to hire a statistician, reading a scientific article, time series data, drawing a picture. Basic review.		HW2 due Saturday, Oct 5, at 11:00pm