COURSE INFORMATION

Course title:	Application of Statistics in Management		
Course code:	BABS 550	Credits:	1.5
Session, term, period:	2021W Term 1 Period 1	Class location:	001 HA 133 002 HA 132
Section(s):	001 002	Class times:	001: Tue / Thu 10am – 12pm 002: Tue / Thu 8am – 10am
Course duration:	Sept 7 – Oct 16, 2021	Pre-requisites:	n/a
Division:	Operations and Logistics	Co-requisites:	n/a
Program:	FT MBA		

INSTRUCTOR INFORMATION

Instructor:	Julia Yan, PhD		
Email:	julia.yan@sauder.ubc.ca	Office location:	HA 468
		Office hours:	*By appointment – email*

Teaching assistants:	Cindy Chen and Quan Chen
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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. 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. Emphasis will be on applying this material in managerial settings, rather than the underlying mathematics, so all techniques will be illustrated with applications. Computations will be done primarily with Microsoft Excel.

COURSE FORMAT

This course is structured as ten lectures. Most lectures require you to think about and complete a related 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

Component	Weight
Attendance and Participation	10%
Pre-class prep/review questions (5)	10%
Homework (2)	30%
Chart assignment (1)	10%
Exam	40%
Total	100%

Details of Assessments

Attendance and Participation:
Students who display repeated tardiness and/or absences will lose 0.5% for each late arrival and 1% for each missed class.

Pre-Class questions:
A number of classes have a brief prep or review question due at the beginning of class (posted and submitted on Canvas). These 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 (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

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:
  - **(Recommended)** 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.
  - 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.

*COVID-19 **Policies for Attendance & Academic Concessions:***

If a student feels unwell, they should stay home and send a courtesy email to each impacted instructor and cc their program manager. The student should also submit an Academic Concession Request & Declaration Form.

If a student suspects possible Covid-19 infection, they should use the BC Ministry of Health's self-assessment tool, to help determine whether further assessment or testing for COVID-19 is recommended.

If a student is required to self-isolate (e.g., while waiting for test results), they should follow the steps above (stay home, email instructor(s) and program manager, submit an Academic Concession Request & Declaration Form, and follow BC Health Guidance.

Students who are required to quarantine, should get in touch with their Program Manager to discuss the possibility of academic concessions for each impacted course. The Program Manager will work closely with your instructors to explore options for you to make up the missed learning.

COVID-19 ***Safety in the Classroom:***

Masks: Masks are **required** for all indoor classes, as per the BC Public Health Officer orders. For our in-person meetings in this class, it is important that all of us feel as comfortable as possible engaging in class activities while sharing an indoor space. For the purposes of this order, the term "masks" refers to medical and non-medical masks that cover our noses and mouths. Masks are a primary tool to make it harder for Covid-19 to find a new host. You will need to wear a medical or non-medical mask for the duration of our class meetings, for your own protection, and the safety and comfort of everyone else in the class. You may be asked to remove your mask briefly for an ID check for an exam, but otherwise, your mask should cover your nose and mouth. Please do not eat in class. If you need to drink water/coffee/tea/etc, please keep your mask on between sips. Students who need special accommodation are asked to discuss this with the program office.

Seating in class: To reduce the risk of Covid transmission, please sit in a consistent area of the classroom each day. This will minimize your contacts and will still allow for the pedagogical methods planned for this class to help your learning.

Visit the following website for the most recent updates regarding Covid-19 protocol on campus:https://students.ubc.ca/campus-life/returning-to-campus

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

In-Person Regulations

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.

On-Line Lecture Regulations

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 program/website for an in-class activity. Feedback from students indicates that personal devices are the number one distraction from effective learning and participation in the online learning environment.

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.

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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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 SCHEDULE

(Subject to change with class consultation)

Class	Date	Topic	Readings	Assessments due
1	Sep 7	**Introduction.** What is Statistics? Fundamentals: data types, summary statistics, visualization. Normal distribution, intro to hypothesis testing.		
2	Sep 9	**Confidence Intervals.** Central limit theorem, one-sample z-test. P-values, confidence intervals, relation to hypothesis tests.	Read: The Brinery (Background, I-III)	**Q1** (review) due at beginning of class
3	Sep 14	**Hypothesis Tests.** Two sample z-tests and confidence intervals. One sample t-test, normal distribution vs. t-distribution.	Read: The Brinery IV, V	**Q2** (review) due at beginning of class
4	Sep 16	**Comparison of Means.** Sample size, two-sample t-tests and one-way ANOVA. Variations on t-tests, including paired t-test.	Read: The Brinery VI	**HW1** due Sunday, Sep 19, at 11:00pm
5	Sep 21	**Categorical Data**. Chi-square tests, counts, joint and marginal distributions, hypothesis tests with no corresponding interval.		**Q3** (prep) due at beginning of class
6	Sep 23	**Simple Linear Regression.** Experimental vs Observational data. Association, correlation, & causation; residuals, assumptions; transformations.		**Q4** (prep) due at beginning of class
7	Sep 28	**Multiple Regression.** Hypotheses; parsimony, multicollinearity, comparing models; hypothesis tests; variable selection.		**Q5** due at beginning of class
8	Sep 30	**More Regression.** Outliers, leverage, influential points; higher order terms & dummy variables; logistic regression. Regression practice cases.		**Chart assignment** due Sunday, Oct 3, at 11:00pm
9	Oct 5	**Statistics in Real Life.** Model assumptions, ethics, dirty data, when to hire a statistician.		
10	Oct 7	**Review and Practice.** Review problems, practice, questions & answers.		**HW2** due Friday, Oct 8 at 11:00pm
Exam Week	TBD			**Exam**