COURSE INFORMATION

Course title:	Application of Statistics in Management		
Course code:	BABS 550	Credits:	1.5
Session and term:	2024W1	Class location:	HA 132
Section(s):	301	Class times:	Sat, Sept 14 8:30am-4pm Sat, Oct 19 8:30am-4pm Sat, Nov 2 8:30am-4pm
Course duration:	Sept 14 – Nov 2, 2024	Pre-requisites:	n/a
Division:	Operations and Logistics	Co-requisites:	n/a

INSTRUCTOR INFORMATION

Instructor:	Julia Yan		
Phone:	604 822 0322	Office location:	HA 468
Email:	julia.yan@sauder.ubc.ca	Office hours:	By appointment, on Zoom

Teaching assistant: Kshitiz Rai
Email: rai.kshitiz26@gmail.com

COURSE DESCRIPTION

We live in an increasingly data-rich world. This course focuses on using data to make good business decisions, and involves the fundamentals of data exploration, visualization, and common statistical methods. The emphasis will be on:

1. Being an informed and critical consumer of statistics,
2. Understanding core statistics concepts both quantitatively and qualitatively, and
3. Applying the material in real-world settings.

All methods will be illustrated with real data whenever possible, and we will highlight examples common in daily life (e.g., Netflix, Craigslist, CitiBike, Instacart).

COURSE FORMAT

The course is structured as three day-long classes. There are lectures as well as group activities. 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 methods are appropriate for different types of data and situations.
2. Use visualization and key statistical tools (confidence intervals, hypothesis tests, and regression) to interpret data, tell stories, and draw conclusions.
3. Understand the strengths and limitations behind various methods, metrics, and experiments.

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

At UBC Sauder, we are committed to responsible business practices that can have transformative impacts on society. One of the ways we are reinforcing our commitment to responsible business is by showcasing relevant content in our courses via the lens of the United Nations Sustainable Development Goals. In this course, we will touch on topics that relate to the following goals:

Sustainable Development Goal	Description of how and when the goal is covered in the course.
Goal 10: Reduce Inequality 	On the second day of class, we will discuss topics including algorithmic fairness and equity (Goal 10: Reduced Inequality), consumer protection and well-being in the era of big data (Goal 12: Responsible Consumption and Production), and ethical responsibilities in the technology sector (Goal 16: Peace, Justice, and Strong Institutions).
Goal 12: Responsible Consumption and Production 	
Goal 16: Peace, Justice, and Strong Institutions 	

ASSESSMENTS

Summary

Component	Weight
Group Assignments (4)	10%
Clicker Questions (~10)	5%
Weekly Review (5)	5%
Homework (3)	40%
Final Exam	35%
Attendance/Participation	5%
Total	100%

Details of Assessments

Group Assignments: There will be group assignments to be begun during class and submitted before the subsequent class.

Clicker Questions: Lectures will have brief multiple-choice questions (conducted on iClicker) throughout class. Any form of participation will receive quarter credit, and the correct answer will receive full credit.

Weekly Review: To ensure that you are thinking about the material during the long breaks between classes, every weekend that we do not have class will have a short review question due that same weekend. Any submission will receive half credit.

Homework: There are three homework assignments, each of which will be posted at least one week prior to the due date on Canvas. You are encouraged to look at the homework assignments early.

Final Exam: The final exam (Nov 17, time TBD) covers all material from class: lecture notes, group assignments, clicker questions, and homework. The final exam is open notes: slides, personal notes, textbook, Excel spreadsheets are all allowed. Students must take the exam at the scheduled time unless arrangements have been made with the RHL Office or Centre for Accessibility. The exam will be delivered online.

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.

Collaboration: You are encouraged to work with classmates on prep questions and homework 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.*

LEARNING MATERIALS

Slides will be posted on Canvas.
There is a free, optional textbook available at this link: https://www.openintro.org/book/os/
Most computations can be done in Excel using the Analysis Toolpak. See Canvas for Excel instructions.

Academic Concessions

Requesting Academic Concessions
If you experience unanticipated events or other circumstances that constitute valid grounds for academic concession as defined by UBC's Academic Concession Policy, complete and submit the Academic Concession Request & Declaration Form. Concessions are time-senstive and the online form should be submitted within 48 hours of the missed deadline. Upon submission, your request will be recorded in the RHL and you will also receive an email with further insturctions. Please read this email carefully and be sure to also refer to the relevant course syllabus for each concession that you have requested. Please know that you should continue to work on the coursework for the course(s) which you submitted a concession. You should anticipate being asked to submit work or write an exam as soon as the circumstances affecting your ability to fulfil your academic responsibilities are resolved.

Code Plagiarism

Code plagiarism falls under the UBC policy for Academic Misconduct. Students must correctly cite any code that has been authored by someone else or by the student themselves for other assignments. Cases of "reuse" may include, but are not limited to:

- the reproduction (copying and pasting) of code with none or minimal reformatting (e.g., changing the name of the variables)
- the translation of an algorithm or a script from a language to another
- the generation of code by automatic code-generations software

An "adequate acknowledgement" requires a detailed identification of the (parts of the) code reused and a full citation of the original source code that has been reused.
Students are responsible for ensuring that any work submitted does not constitute plagiarism. Students who are in any doubt as to what constitutes plagiarism should consult their instructor before handing in any assignments.

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

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.

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 Indigeneity (including identification as First Nation, Métis, or Inuit), 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.

Use of Artificial Intelligence

Any work submitted must be your own original work. Any use of generative artificial intelligence (AI), including ChatGPT, is prohibited and constitutes academic misconduct. Any student suspected of submitting work that includes AI generated content may be asked for preliminary work or other materials to evidence the student's original and unaided authorship. The student may also be asked to separately explain or support their work. AI identification methods may also be employed by the instructor. After review, if it is determined by the instructor that submitted work likely contains AI generated content, the work may receive a zero and may be subject to further misconduct measures set out in the UBC Academic Calendar.

Why? I recognize that generative AI tools are increasingly prevalent and powerful. I acknowledge that it is important to be aware of their capabilities. However, I also believe that the most effective learning experiences in my course are driven by *in-person interaction* (i.e., you ask questions of each other and of the teaching team) and *dedicated effort* on problem sets without peeking at answers (i.e., your answers are truly your own). Challenge and trust yourself to learn the right way. You'll need a solid understanding of the material if you want to apply it in the jungle of real-world business analytics.

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 consultation)

Class	Date	Topic	*Optional* Readings	Assessments due
1	Sept 14	**Introduction.** Fundamentals of data (types, visualization, summary statistics) and probability (Normal distribution, z-scores).	OpenIntro Ch 1.1, 1.2, 2.1, 2.2, 3.1, 3.5, 4.1	**Clicker Questions** in class **Weekly Review** due Sun, Sept 22, Sept 29, Oct 6, Oct 13 at 11pm **Group Assignments** 1 and 2 due Friday, Oct 18 at 11pm **HW1** due Friday, Oct 18 at 11pm
		Confidence Intervals. Central limit theorem. One- and two-sample confidence intervals. Sample size.	OpenIntro Ch 1.3, 3.3, 5.1, 5.2, 6.1	
2	Oct 19	**Hypothesis Tests (Proportions).** One-sample and two-sample z-tests.	OpenIntro Ch 5.3, 6.1, 6.2	**Clicker Questions** in class **Weekly Review** due Sun, Oct 26 at 11pm **Group Assignment** 3 due Fri, Nov 1 at 11pm **HW2** due Fri, Nov 1 at 11pm
		Hypothesis Tests (Means). One-sample and two-sample t-tests.	OpenIntro Ch 7.1, 7.2, 7.3, 7.5	
		Statistics in Practice. Experimentation case and ethics.		
3	Nov 2	**Simple Linear Regression.** Quantitative response variables. Correlation, interpretability, residuals, R-squared.	OpenIntro Ch 8.1, 8.2, 8.4	**Clicker Questions** in class **Group Assignment** 4 due Sun, Nov 10 at 11pm **HW3** due Sun, Nov 10 at 11pm
		Multiple Linear Regression. Parsimony, multicollinearity, overfitting. Hypothesis testing for regression, variable selection.	OpenIntro Ch 8.4, 9.1, 9.2	
		More Regression. Categorical explanatory variables. Variable transformations. Logistic Regression.	OpenIntro Ch 8.3, 9.3, 9.5	
Exam	Nov 17			**Exam** (online)