

### COURSE INFORMATION

Course title:	Application of Statistics in Management		
Course code:	BABS 550	Credits:	1.5
Session and term:	2023W1	Class location:	Lecture HA 335 Tutorial (Optional) HA 335
Section(s):	MM1	Class times:	Lecture Tue/Thu 2-4pm Tutorial (Optional) Thu 1-2pm
Course duration:	Sept 5 – Oct 7, 2023	Pre-requisites:	n/a
Division:	Operations and Logistics	Co-requisites:	n/a

### INSTRUCTOR INFORMATION

Instructor:	Julia Yan	Office location:	HA 468
Phone:	604 822 0322	Office hours:	Come to tutorial
Email:	julia.yan@sauder.ubc.ca		

Teaching assistant: [TBD]  
Email: [TBD]

### 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 (i) being an informed and critical consumer of statistics, (ii) understanding core statistics concepts both quantitatively and qualitatively, (iii) applying the material in complex, real-world settings.

All methods will be illustrated with real data whenever possible, and we will highlight (from Netflix, Craigslist, CitiBike, Instacart, and more) common in our daily lives.

### COURSE FORMAT

The course is structured as ten lectures. Some lectures require you to think about and complete a review 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 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 experimental designs.

### 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.
<p><b>Goal 10: Reduce Inequality</b></p> 	<p>In the last week 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).</p>
<p><b>Goal 12: Responsible Consumption and Production</b></p> 	
<p><b>Goal 16: Peace, Justice, and Strong Institutions</b></p> 	

## ASSESSMENTS

### Summary

<u>Component</u>	<u>Weight</u>
Prep Questions (4)	10%
Clicker Questions (~10)	5%
Homework (3)	40%
Final Exam	40%
Attendance/Participation	5%
Total	100%

### Details of Assessments

**Prep Questions:** Lectures 2, 3, 4, and 8 are associated with prep questions that are due immediately before class. The first three prep questions reinforce the material of Lectures 1, 2, and 3, respectively. The last prep question involves concepts that were covered throughout the course.

**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.

**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 (date/time TBD) covers all material from class: lecture notes, prep questions, 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.

**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.

### 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. Regrade requests should be submitted within 72 hours of grades being posted, by email to the instructor. Grades can go up or down following a regrade request.

#### *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](#). 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](#).

#### *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

#### *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:

<https://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, written without outside assistance or collaboration. Any use of generative artificial intelligence (AI), including ChatGPT, is not permitted 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](#).

### ACKNOWLEDGEMENT

UBC’s Point Grey Campus is located on the traditional, ancestral, and unceded territory of the x̣ṃəθḳẉəỵəm (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	Readings or Activities	Assessments due
1	Sept 5	<b>Introduction.</b> Fundamentals of data (types, visualization, summary statistics) and probability (Normal distribution, z-scores).	<i>OpenIntro</i> Ch 1.1, 1.2, 2.1, 2.2, 3.1, 3.5, 4.1	
2	Sept 7	<b>Confidence Intervals.</b> Central limit theorem. One- and two-sample confidence intervals. Sample size.	<i>OpenIntro</i> Ch 1.3, 3.3, 5.1, 5.2, 6.1	<b>Prep Q1</b> due Thursday, Sept 7, at 2:00pm
3	Sept 12	<b>Hypothesis Tests (Proportions).</b> One-sample and two-sample z-tests.	<i>OpenIntro</i> Ch 5.3, 6.1, 6.2	<b>Prep Q2</b> due Tuesday, Sept 12, at 2:00pm
4	Sept 14	<b>Hypothesis Tests (Means).</b> One-sample and two-sample t-tests. Challenges of hypothesis testing.	<i>OpenIntro</i> Ch 7.1, 7.2, 7.3, 7.5	<b>Prep Q3</b> due Thursday, Sept 14, at 2:00pm

				<b>HW1</b> due Sunday, Sept 17, at 11:00pm
5	Sept 19	<b>Simple Linear Regression.</b> Quantitative response variables. Correlation, interpretability, residuals, R-squared.	<i>OpenIntro</i> Ch 8.1, 8.2, 8.4	
6	Sept 21	<b>Multiple Linear Regression.</b> Parsimony, multicollinearity, overfitting. Hypothesis testing for regression, variable selection.	<i>OpenIntro</i> Ch 8.4, 9.1, 9.2	<b>HW2</b> due Sunday, Sept 24, at 11:00pm
7	Sept 26	<b>More Regression.</b> Categorical explanatory variables. Variable transformations.	<i>OpenIntro</i> Ch 8.3, 9.3, 9.4	
8	Sept 28	<b>Logistic Regression.</b> Binary response variables. Interpretability, accuracy.	<i>OpenIntro</i> Ch 9.5	<b>Prep Q4</b> due Thursday, Sept 28, at 2:00pm
9	Oct 3	<b>Statistics in Practice.</b> Case study and discussion of current issues.		
10	Oct 5	<b>Review Session.</b> Review problems, questions & answers.		<b>HW3</b> due <b>Friday</b> , Oct 6 at 11:00pm
Exam	TBD			<b>Exam</b>