

### COURSE INFORMATION

Course title:	Descriptive and Predictive Business Analytics		
Course code:	BABS 507		
Session, term, period:	2023W1	Class location:	ANGU-435 (BA1) DLAM-125 (BA2)
Section(s):	BA1, BA2	Class times:	T/R 10am-12pm (BA1) T/R 8am-10am (BA2)
Course duration:	Sept 5 – Oct 6, 2023		
Division:	Operations and Logistics		
Program:	MBAN		

### INSTRUCTOR INFORMATION

Instructor:	Michael Kim		
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### 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 applications (from Netflix, Craigslist, CitiBike, Instacart, and more), and we will use real data whenever possible.

### 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. Understand the strengths and limitations behind various methods, metrics, and experimental designs.
3. Use visualization and key statistical tools (confidence intervals, hypothesis tests, and regression) to interpret data, tell stories, and draw conclusions.

## ASSESSMENTS

### Summary

<u>Component</u>	<u>Weight</u>
Problem Sets (3)	15%
Quiz	20%
Final Exam	50%
Attendance/Participation	<u>15%</u>
Total	<u>100%</u>

### Details of Assessments

#### Problem Sets:

There are three problem sets, each of which will be posted at least one week prior to the due date on Canvas. 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, and homework. Students must take the exam at the scheduled time unless arrangements have been made with the RHL Office.

#### 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.

## LEARNING MATERIALS

Slides will be posted on Canvas.

There is a free, optional textbook: K.M. Ramachandran and C.P. Tsokos, *Mathematical Statistics with Applications in R* 3e. Academic Press, 2021.

Computations will be done in R.

## 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.

### *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.

### *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 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.

### COPYRIGHT

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 and could be subject to legal action. Any lecture recordings are for the sole use of the instructor and students enrolled in the class. In no case may the lecture recording or part of the recording be used by students for any other purpose, either personal or commercial. Further, audio or video recording of classes are not permitted without

the prior consent of the instructor. Students may not share class Zoom links or invite others who are not registered to view sessions.

#### ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the x<sup>w</sup>məθk<sup>w</sup>əyəm (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	Optional Readings	Assessments due
1	Sept 5	<b>Foundations I.</b> Fundamentals of data: types, visualization, summary statistics; probability review, special distributions.	R&T Ch 1-3	
2	Sept 7	<b>Foundations II.</b> Sampling distributions, definition of a statistic, central limit theorem.	R&T Ch 4	
3	Sept 12	<b>Applications I.</b> Predictive and descriptive analytics for queuing systems.		
4	Sept 14	<b>Confidence Intervals I.</b> Point estimates; confidence intervals; single sample estimation problems: mean, proportion.	R&T Ch 5	<b>PS1</b> due Sept 15, at 11:59pm
5	Sept 20	<b>Applications II.</b> Predictive and descriptive analytics for inventory systems.		
6	Sept 21	<b>Confidence Intervals II.</b> Single sample estimation problems: variance. Two sample estimation problems: two means, two proportions, two variances.	R&T Ch 5	<b>PS2</b> due Sept 22, at 11:59pm
7	Sept 26	<b>Quiz + Regression I.</b> Quantitative response variables. Correlation, interpretability, residuals, R-squared.	R&T Ch 7	<b>Quiz</b>
8	Sept 28	<b>Regression II.</b> Prediction and confidence intervals.	R&T Ch 7	
9	Oct 3	<b>Hypothesis Testing I.</b> Type I vs type II errors; p-values; null vs alternative hypothesis; tests on mean & proportions: one sample, two samples.	R&T Ch 6	
10	Oct 5	<b>Special Topics (e.g. Multi-armed Bandits) + Review Session.</b>		<b>PS3</b> due Oct 6 at 11:59pm
Exam	TBD			<b>Exam</b>

**DUE DATES**

- **September 15, 2023 @ 11:59PM PDT:** Problem set 1
- **September 22, 2023 @ 11:59PM PDT:** Problem set 2
- **September 26, 2023 @ 11:59PM PDT:** Quiz
- **October 6, 2023 @ 11:59PM PDT:** Problem set 3