



iSchool Mission: Through innovative research, education and design, our mission is to enhance humanity's capacity to engage information in effective, creative and diverse ways.

LAIS 609C – Making Sense with Data – Course Syllabus

We acknowledge that we are on the traditional, ancestral and unceded territory of the hə́nq̓míḥəm speaking Musqueam people.

Program: LAIS; MLIS	LAIS; MLIS
Year: Graduate	Graduate
Course Schedule:	Tuesdays 6pm-8:50pm
Location:	TBA
Instructor:	Ido Roll , idoroll.com.
Office location:	IKB 2.19
Office phone:	604.827.4826
Office hours:	By appointment
E-mail address:	Ido.roll@ubc.ca
Learning Management Site:	https://canvas.ubc.ca/courses/2827

Course Goal: The goals of this course, Making Sense with Data, are to support learners in acquiring basic knowledge and skillset that will allow them to identify, prepare, and analyze data in order to answer questions of interest, and to communicate findings with stakeholders. Thus, the course will focus on alignment of questions, data, and methods; understanding the nature of common descriptive and inferential statistics; choice, preparation, and analysis of data; and verbal, written, and visual communication.

Course Objectives:

Upon completion of this course students will be able to:

1. Formulate research questions in a way that is both informative and answerable [1.3, 4.1]
2. Understand the affordances and constraints of different types and sources of data [4.1]
3. Identify relevant data that are appropriate for chosen questions [4.1, 4.2]
4. Convert and prepare data so they are ready to be analyzed [4.2]
5. Understand the principles, inputs, and outputs of different descriptive statistics such as central tendency, variance and correlations [4.2]
6. Understand the principles, inputs, and outputs of different inferential statistics such as t-test and ANOVA [4.2]
7. Understand the nature of null and alternative hypotheses [4.1, 4.2]
8. Operationalize research questions by identifying relevant dependent variables, independent variables, and covariates [4.2]
9. Identify and estimate sources of noise, error, and randomness [4.2]
10. Use the R software to analyze data in order to answer the chosen question [4.2]
11. Use the web to find, understand, and apply additional R functions as needed [4.1, 4.2]
12. Synthesize and interpret research findings to answer the given questions [1.3, 4.1, 4.2]

13. Communicate research findings meaningfully, succinctly, and accurately in oral and written communication [1.2. 2.1]

Course Topics:

- Formulating effective research questions.
 - Operationalizing questions of interest.
 - Identifying relevant data sources.
- Quantitative data handling.
 - Data preparation
 - Introduction to R (commands, files, markdown)
 - Finding and using R commands from the web
 - Central tendency and graphing with one variable
 - Relationship between two variables
 - Sampling
 - Point and range estimation
 - Hypothesis testing: z test, t test, ANOVA, chi-square
 - Graphing
- Interpreting results
 - P value and its limitations
 - Type I and II errors
 - Synthesis
- Project management and communication
 - Effective team work
 - Oral and written communication
 - Effective time management
 - Iterative project design

Prerequisites: LAIS 605 (previously LIBR 600) or permission of the SLAIS Graduate Advisor

Format of the course: The course is in **studio** format, which combines lectures with hands-on labs and tutorials. Studios are based on hands-on activities and active learning techniques. Students will practice r, clean and prepare data, and apply the taught statistics. The studios will also cover additional aspects of the course such as project management.

During these first weeks, students also begin to develop their projects by choosing research questions, identifying relevant data, and designing analysis plan, with opportunities for feedback and revisions from the instructor and peers.

The last third of the course dedicates much time to the projects. Students will apply and refine their plans, and iterate as needed. The project should be beneficial to the students' professional lives (within or outside the academia). Data for the project is chosen by the students. Possible sources include the UBCx MOOC data and publicly available open data (see here for a comprehensive list: <https://www.opendatabc.ca/pages/hackathon-resources>). A BYOD is also encouraged, to match with research efforts outside the class. The outcome of the project is a draft of a report that can be shared in academic and professional settings.

Required and Recommended Reading: The course is a blended course, combining a group project, on-campus studios and extensive online resources. Most content will be delivered online using the open Statistical Reasoning courseware as a textbook. This is a highly interactive online course that has been found to be more effective than traditional courses (see

<https://net.educause.edu/ir/library/pdf/CSD6115.pdf>). Students will work with the open courseware during the studios and at home. The course can be found here: <https://ubcxonline.exl.ubc.ca/courses/course-v1:UBCxOnline+LAIS609C+2017/info> .

The statistical package that is used is R (<http://cran.rproject.org/>). R is free and works in Windows, Mac, or Linux. Its main advantages are that it is (i) open source, and (ii) has a strong community that offers support. Students should also download and install R Studio, freely available at <http://www.rstudio.com/products/rstudio/>, and R Markdown, <http://rmarkdown.rstudio.com/lesson-1.html>.

Course Assignments: All assignments are due before class on the due date.

<i>Project assignments</i>	<i>Weight</i>	<i>MOOC assignments</i>	<i>Weight</i>	<i>Due date</i>
research question	5%	Introduction	5+2%	January 16 th
		Exploratory Data Analysis – Distributions		
		Exploratory Data Analysis – Relationship		
		Producing Data	5+2%	January 23 rd
		Probability – introduction, random variables	5+2%	January 30 th
		Probability – sampling distribution		
		Inferences – estimation		
		Inferences – hypothesis testing overview	5+2%	February 6 th
Project plan	10%	Inferences – population proportion	5+2%	February 13 th
		Inferences – population mean		February 27 th
Peer feedback (1)	2%	Inferences – relationships C->Q	5+2%	March 6 th
		Inferences – relationships C->C	5+2%	March 13 th
		Inferences – relationships Q->Q		
Project presentation	20%			April 3 rd
Peer feedback (2)	2%			April 6 th
Project report	11%			April 24 th
		Participation	10%	
Overall:	50%		50%	

Notice: *Project grades* are assigned for learning. If you work hard, attend to feedback, and show progress, you will receive full marks, even if the product is not perfect.

MOOC grades have seven sets of weekly assignments, each of which worth 5% for summative checkpoints and 2% for simple R exercises. Final grade will consist of top 6 checkpoints ($6 * 5\% = 30\%$) and top 5 R assignments ($5 * 2\% = 10\%$).

You are welcome to resubmit assignments in order to improve your mark. Resubmitted assignments should be handed in within one week of receiving feedback. The final mark is an average of the original mark and the new one. For instance, if you receive 4/10 for the original submission and 10/10 for the resubmission, your final mark for this assignment will be 7/10.

Late submissions will lose 10% per day unless I okay the new submission date in advance (for example, a late 5% assignment will lose .5% per day).

Course Schedule [week-by-week]:

Week #	Date	Topic
1	January 9 th	Introduction: data are your friend The edX site; R and R studio Central tendency and variability
2	January 16 th	Open data, replication crisis What makes a good research question? Graphing, correlation, z scores
3	January 23 rd	Probability Normal distributions
4	January 30 th	Confidence intervals
5	February 6 th	P value with its false promises Project plan workshop
6	February 13 th	Type i, type ii errors T-test Effect size
	February 20 th	- - - <i>Midterm break</i> - - -
7	February 27 th	Project plan presentations Review
8	March 6 th	Work on MOOC, projects
9	March 13 th	Practical ANOVAs Choosing the right tests Time to work on projects
10	March 20 th	Linear regressions Time to work on projects
11	March 27 th	Time to work on projects
12	April 3 rd	Project presentations

Attendance:

As the course is highly interactive, and most learning happens in class, attendance is required in all studio meetings. If you know you are going to be absent you must inform me beforehand if at all possible.

Feedback:

Feedback is a main mean of learning. I provide frequent and detailed feedback and am glad to hear from you. You are always welcome to write me at ido.roll@ubc.ca.

Learning in and from this course:

Here are several tips for learning in this course. These will help you to get the most out of this experience in a way that will contribute to other courses and your lives outside the university.

- Set aside time. Do not postpone assignments to the last minute. Start early, since most assignments require more than one week.
- Be active. Think, take initiative, create. Look for connections to other courses and to your personal experiences.
- Listen carefully to your peers. Try to understand which of their challenges also applies to you.
- Share. Speak what is on your mind. Express your opinions. Communicate. Offer feedback. When something does not work right for you, let me know.
- Ask. Material may be tricky. Make sure you understand. Use the opportunity to learn.

- Practice, practice, practice. An assignment may have a low impact on your grade, but large impact on future assignments.
- Be creative. Dare. Break through artificial boundaries. Challenge yourself.
- Use your time wisely. Do not get stuck on minor details. Evaluate whether what you do is worth doing. Remember your goals and make sure you make progress.

Evaluation: All assignments will be marked using the evaluative criteria given on the [SLAIS web site](#).

Access & Diversity: Access & Diversity works with the University to create an inclusive living and learning environment in which all students can thrive. The University accommodates students with disabilities who have registered with the Access and Diversity unit: [\[https://students.ubc.ca/about-student-services/access-diversity\]](https://students.ubc.ca/about-student-services/access-diversity). You must register with the Disability Resource Centre to be granted special accommodations for any on-going conditions.

Religious Accommodation: The University accommodates students whose religious obligations conflict with attendance, submitting assignments, or completing scheduled tests and examinations. Please let your instructor know in advance, preferably in the first week of class, if you will require any accommodation on these grounds. Students who plan to be absent for family obligations, or other similar commitments, cannot assume they will be accommodated, and should discuss with the instructor before the course drop date. UBC policy on Religious Holidays: <http://equity.ubc.ca/days-of-significance-calendar/>

Academic Integrity

Plagiarism

The Faculty of Arts considers plagiarism to be the most serious academic offence that a student can commit. Regardless of whether or not it was committed intentionally, plagiarism has serious academic consequences and can result in expulsion from the university. Plagiarism involves the improper use of somebody else's words or ideas in one's work. The UBC policy on Academic Misconduct is available here: <http://www.calendar.ubc.ca/Vancouver/index.cfm?tree=3,54,111,959>.

It is your responsibility to make sure you fully understand what plagiarism is. Many students who think they understand plagiarism do in fact commit what UBC calls "reckless plagiarism." The UBC Learning Commons has a resource page on how to avoid plagiarism, with policies on academic integrity and misconduct found here: <http://learningcommons.ubc.ca/resource-guides/avoid-plagiarism/>

If after reading these materials you still are unsure about how to properly use sources in your work, please ask your instructor for clarification.

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