THE UNIVERSITY OF BRITISH COLUMBIA

STAT 230: INTRODUCTORY STATISTICS

Winter 2021 Term 1

Instructor:	Dr. Irene Vrbik (she/her)	
Office:	SCI 104	
email:	irene.vrbik@ubc.ca	
Lectures:	Tue Thu 11:00 –12:30	*via Zoom*
Office Hours:	Thursday 2:00 – 3:00 PM	*via Zoom*

Updated: Thursday, September 9 *see changes in red*

Land Acknowledgement

We respectfully acknowledge the Syilx Okanagan Nation and their peoples, in whose traditional, ancestral, unceded territory UBC Okanagan is situated.

Course Description

Official Calendar: Applied statistics for students with a first-year calculus background. Estimation and testing of hypotheses, problem formulation, models and basic methods in analysis of variance, linear regression, and non-parametrics. Descriptive statistics and probability are presented as a basis for such procedures. Credits: 3

Pre-reqs: One of MATH 101, MATH 142 and one of DATA 101, COSC 221, ECON 102.

Course Objectives: The course is designed to give students a solid foundation in statistics and present probability as the basis for making decisions. By taking this course, students will be positioned to assess the presence of variability in real-world problems and realize the importance of statistical approaches to decision-making when variability is present. Statistical tools play a vital role in modern day research and data analysis. Consequently, statistical software (particularly R) will be incorporated throughout the course.

Learning Outcomes:

At the end of this course, students should be able to:

1. define and differentiate between key terminology and special notation used in statistics;
2. demonstrate their understanding of descriptive statistics by using R to create numerical and graphical data summaries and properly interpreting those results;
3. demonstrate an understanding of basic probability concepts through identifying key distributions, computing basic probabilities, and properly interpreting their numeric value;

4. explain statistical inference concepts, including sampling distributions, confidence intervals, hypothesis tests, and p-values;
5. demonstrate their knowledge of basic statistical inferential by identifying an appropriate statistical procedure in a variety of situations, carrying out the statistical procedure (either "by hand" or using statistical software), and effectively communicating a proper interpretation of the results;

Course Format: Synchronous, i.e. real-time delivery of lectures, will be held via Zoom (links provided on Canvas). These zoom sessions will be recorded and uploaded to Canvas for reviewing. Incomplete slide decks (i.e. "handouts") will be posted to Canvas prior to our scheduled lecture time. Students are encouraged to fill out any missing components by taking notes during class sessions. In the event that note taking during the lecture should interfere with the students' ability to listen, please be aware that "complete" presentation slides—in the form of annotated handouts (completed by myself during lecture)—will be posted to Canvas after each lecture. Classes will be interactive consisting of topic introduction and concept mastery with in-class exercises. Comprehension of concepts will be evaluated with the use of iClicker survey questions. While statistical software will be discussed during lecture, practical skills and applications of topics are covered primarily in computer labs.

Office Hour Format: I will hold virtual office hours via zoom each Thursday 2:00 – 3:00 PM. If you are unable to make those times, please reach out to me to schedule an alternative appointment. Zoom links will be provided on Canvas.

Marking and Evaluation

	Weight (in percent %)					
Grade Item	**Default**	**Alt 1**	**Alt 2***	**Alt 3**	**Alt 4**	
Participation	5	0	5	0	0	
Assignments	20	0	20	20	0	
Midterm 1	20	0	0	20	20	Tuesday, October 12
Midterm 2	20	0	20	20	20	Thursday, November 18
Final Exam	35	100	55	40	60	TBD

* A similar accommodation for Midterm 2 will be considered

Final grades will be based on the evaluations listed above. Note that the alternative weighting schemes will only be used if it improves your grade from the default calculation. The final grades will be assigned according to the standardized grading system outlined in the UBC Okanagan Calendar.

Grading Practices: Faculties, departments, and schools reserve the right to scale grades in order to maintain equity among sections and conformity to University, faculty, department, or school norms. Students should therefore note that an unofficial grade given by an instructor might be

changed by the faculty, department, or school. Grades are not official until they appear on a student's academic record. http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,41,90,1014

Participation: Participation will be graded on the basis of in-class iClicker responses. To receive the full 5%, students will need to respond to at least 80% of in-class questions.

Midterms: There will be two (2) synchronous midterms given during the term. Midterms will be formatted as a timed Canvas quizes scheduled during our designated lecture time on **Tuesday, October 12** and **Thursday, November 18**. Midterms are not cumulative, in that second midterm will only cover the new material presented after the material covered on the first midterm.

Final Exam: The examination period begins Saturday, December 11 and ends Wednesday, December 22. The final exam is comprehensive, covering all the material presented throughout the course. The final exam will be held **online** in a format similar to your midterms. The date and time is to be determined (TBD).

Assignments: There will be approximately six (6) assignments. Assignments will incorporate material covered during lab as well as lecture. Answers will be submitted electronically through a Canvas quiz.

Missing/Late Grade Items:

Partcipation If you are not attending live zoom lectures there will be no opportunity to score on the *Participation* grade idem. Consequently, the 5% will be shifted to the final exam according to the *Alt 3* grading scheme.

Assignments Assignments are to be submitted electronically through Canvas. Late assignments will have 10% deducted for each day (which includes weekends) beyond the due date. **Assignments that are more than 5 days overdue will not be accepted.**

Midterms Missed midterms will have their weight shifted to the final according to the according to the *Alt 2* grading scheme. **NO make-up tests will be provided**.

Final Examinations Except in the case of examination clashes and hardships (three or more formal examinations scheduled within a 24-hour period) or unforeseen events, students will be permitted to apply for out-of-time final examinations only if they are representing the University, the province, or the country in a competition or performance; serving in the Canadian military; observing a religious rite; working to support themselves or their family; or caring for a family member. Unforeseen events include (but may not be limited to) the following: ill health or other personal challenges that arise during a term and changes in the requirements of an ongoing job. Further information on **Academic Concession** can be found under **Policies and Regulation in the *Okanagan Academic Calendar*** http://www.calendar.ubc.ca/okanagan/index.cfm?tree=3,48,0,0

Course Material and Tools

Course Website: The course website can be accessed through UBCO's Learning Management System (LMS) Canvas: https://canvas.ubc.ca/. It is recommended that you log in daily to check for announcements, participate in discussions, access course materials, submit and complete assignments, and review upcoming deadlines. You can review and change default notification preferences for this course if you wish.

Suggested Textbooks: The lecture slides in combination with lab materials are intended to be self-contained and comprehensive in terms of the learning outcomes. Hence, no textbook is required. If, however, you are looking for some supplementary material I suggest the following textbooks:

> **Title:** OpenIntro Statistics
> **Authors:** David Diez, Mine Cetinkaya-Rundel, and Christopher Barr
> **Download page**: https://www.openintro.org/book/os/ (available for free)
>
> **Title:** R by Example
> **Authors:** Jim Albert and Maria Rizzo
> **E-book available here**: https://www.library.ubc.ca/ (requires login)

Software: We will illustrate some of the statistical concepts and computations using R. I strongly recommend that you use RStudio for running R.

Course Tools: We will be using iClicker to collect student responses to in-class questions during live zoom sessions. Students must create a student account, then access the web application or mobile app to individually answer questions. For support with iClicker visit the Student Learning Hub (Okanagan) of the LT Hub Student Guide (Vancouver). **You do not need to purchase a physical iClicker remote**.

Labs

Lab format: All students must be registered for a lab (held weekly unless otherwise specified). Please check your registration to determine your lab section and time. Labs are structured as walk-though lessons that supplement the lecture material and help to develop practical skills and applications in R. You may work through the lab material on your own time and/or work through them during your scheduled lab. To ensure that TAs are not overloaded during a single lab, please do not attend labs for which you are not registered.

Labs sessions will be hosted by your TA online via zoom (links provided in Canvas). While they are primarily there to provide guidance on the lab material, they additionally provide the opportunity to meet other students from class, ask questions and/or discuss concepts from lecture, and receive assistance on assignments. Thus, labs will act as addition "office hours" held by your TAs. While labs are not mandatory (i.e. attendance will not be taken) you are highly encouraged to attend. Do

not skip going through this material as **lab content will be fair game for testing on midterms and the final exam.**

Tentative Course Schedule

Below is a tentative outline for the course broken into modules. These topics are subject to change depending upon how quickly we can cover the material.

Module 1: Introduction to Data
Module 2: Probability
Module 3: Distributions of random variables
Module 4: Foundations for inference
Module 5: Inference for numerical data
Module 6: Introduction to linear regression
Module 7: Analysis of Variance

Please note the following holidays:

- **National Day for Truth and Reconciliation**, September 30
- **Thanksgiving Day** October, 11
- **Midterm break** November 8–12 (inclusive)

If you celebrate any other holidays that are not listed above, please feel free to contact me directly if you feel that they will potentially conflict with the outlined course structure. For other important UBCO related dates visit: http://www.calendar.ubc.ca/okanagan/academicyear.cfm

Expectations

Your responsibilities to this class and to your education as a whole, include attendance and participation. You have a responsibility to help create a classroom environment where all may learn. At the most basic level, this means you will respect the other members of the class and the instructor and treat them with the courtesy you hope to receive in return. Inappropriate classroom behaviour may include: disruption of the classroom atmosphere, profanity in classroom discussion, use of abusive or disrespectful language toward the instructor, a student in the class, or about other individuals or groups. While I do not require that you turn on your video during lecture, I trust that those in attendance will remain present and refrain from engaging in non-class activities. I also ask that students microphones will remain muted during lectures (unless addressing the class) to prevent any background noise distractions.

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.

A more detailed description of academic integrity, including the University's policies and procedures, may be found in the Academic Calendar at: http://okanagan.students.ubc.ca/calendar/index.cfm?tree=3,54,111,0.

Cooperation vs. Cheating

Working with others on assignments is a good way to learn the material and we encourage it. However, there are limits to the degree of cooperation that we will permit. Any level of cooperation beyond what is permitted is considered cheating.

When working on programming assignments, you must work only with others whose understanding of the material is approximately equal to yours. In this situation, working together to find a good approach for solving a programming problem is cooperation; listening while someone dictates a solution is cheating. You must limit collaboration to a high-level discussion of solution strategies, and stop short of actually writing down a group answer. Anything that you hand in, whether it is a written problem or a computer program, must be written by you, from scratch, in your own words. If you base your solution on any other written solution, you are cheating. If you provide your solution for others to use, you are also cheating.

Copyright Disclaimer

Diagrams and figures included in lecture presentations adhere to Copyright Guidelines for UBC Faculty, Staff and Students http://copyright.ubc.ca/requirements/copyright-guidelines/ and UBC Fair Dealing Requirements for Faculty and Staff http://copyright.ubc.ca/requirements/fair-dealing/. Some of these figures and images are subject to copyright and will not be posted to ***Canvas***. All material uploaded to ***Canvas*** that contain diagrams and figures are used with permission of the publisher; are in the public domain; are licensed by Creative Commons; meet the permitted terms of use of UBC's library license agreements for electronic items; and/or adhere to the UBC Fair Dealing Requirements for Faculty and Staff. Access to the ***Canvas*** course site is limited to students currently registered in this course. Under no circumstance are students permitted to provide any other person with means to access this material. Anyone violating these restrictions may be subject to legal action. Permission to electronically record any course materials must be granted by the instructor. Distribution of this material to a third party is forbidden.

Grievances and Complaints Procedures

A student who has a complaint related to this course should follow the procedures summarized below:

- The student should attempt to resolve the matter with the instructor first. Students may talk first to someone other than the instructor if they do not feel, for whatever reason, that they can directly approach the instructor. If the complaint is not resolved to the student's satisfaction, the student should e-mail the Associate Head Sylvie Desjardins sylvie.desjardins@ubc.ca or the Department Head pro tem, Dr. Andrew Jirasek at andrew.jirasek@ubc.ca

Student Service Resources

Disability Assistance:
The Disability Resource Centre ensures educational equity for students with disabilities, injuries or illness. If you are disabled, have an injury or illness and require academic accommodations to meet the course objectives, e-mail us or visit our website for more information.
Web: http://students.ok.ubc.ca/drc/welcome.html **E-mail**: drc.questions@ubc.ca

Equity, Human Rights, Discrimination and Harassment:
UBC Okanagan is a place where every student, staff and faculty member should be able to study and work in an environment that is free from human rights-based discrimination and harassment. If you require assistance related to an issue of equity, discrimination or harassment, please contact the Equity Office, your administrative head of unit, and/or your unit's equity representative. **UBC Okanagan Equity Advisor: ph. 250-807-9291**
Web: https://equity.ok.ubc.ca/ **E-mail**: equity.ubco@ubc.ca

Health & Wellness - UNC 337
At UBC Okanagan health services to students are provided by Health and Wellness. Nurses, physicians and counsellors provide health care and counselling related to physical health, emotional/mental health and sexual/reproductive health concerns. As well, health promotion, education and research activities are provided to the campus community. If you require assistance with your health, please contact Health and Wellness for more information or to book an appointment.
Web: www.students.ok.ubc.ca/health-wellness **Email**: healthwellness.okanagan@ubc.ca

Sexual Violence Prevention and Response Office (SVPRO):
A safe and confidential place for UBC students, staff and faculty who have experienced sexual violence regardless of when or where it took place. Just want to talk? We are here to listen and help you explore your options. We can help you find a safe place to stay, explain your reporting options (UBC or police), accompany you to the hospital, or support you with academic accommodations. You have the right to choose what happens next. We support your decision, whatever you decide. Visit svpro.ok.ubc.ca or call us at 250-807-9640

Independent Investigations Office (IIO)

If you or someone you know has experienced sexual assault or some other form of sexual misconduct by a UBC community member and you want the Independent Investigations Office (IIO) at UBC to investigate, please contact the IIO. Investigations are conducted in a trauma informed, confidential and respectful manner in accordance with the principles of procedural fairness. You can report your experience directly to the **IIO by** calling 604-827-2060.

Web: https://investigationsoffice.ubc.ca/ **E-mail**: director.of.investigations@ubc.ca

The Hub

The Student Learning Hub (LIB 237) is your go-to resource for free math, science, writing, and language learning support. The Hub welcomes undergraduate students from all disciplines and year levels to access a range of supports that include tutoring in math, sciences, languages, and writing, as well as help with study skills and learning strategies.

Web: (https://students.ok.ubc.ca/student-learning-hub/) **Ph**: 250-807-9185.

SAFEWALK - Download the UBC SAFE – Okanagan app.

Don't want to walk alone at night? Not too sure how to get somewhere on campus?

Call Safewalk at 250-807-8076 For more information: https://security.ok.ubc.ca/safewalk/