



**University of British Columbia**  
**LFS 252 Land, Food, and Community: Quantitative Data Analysis**  
**January – April 2021**

**Lectures:** Tuesdays and Thursdays (9:30am to 11:00) – GEO 100 (starting Week 3 – hopefully!)

**Instructor:** Michael Johnson, PhD

**Email:** [mjohnson@mail.ubc.ca](mailto:mjohnson@mail.ubc.ca)

**Office Hours:** Thursdays 3:00 to 4:00pm (MCML 352)

**Teaching Assistants (Open Labs, Problem Sets, Assignments and Exam Prep):**

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**Teaching Assistants (R Tutorials Content):**

Xiao Han ([xiao.han@ubc.ca](mailto:xiao.han@ubc.ca))

**Course Description:**

This course will introduce you to key concepts of probability and statistics that have wide applicability in land and food systems. This course consists of an introduction to descriptive statistics, including numerical and graphical presentation of data, measures of central tendency and dispersion and elementary probability. The second part of this course will focus on inferential statistics through selected topics such as sampling, estimation, hypotheses testing, ANOVA and simple linear regression. This course is designed to give students the ability to analyze data and critique statistical techniques used in land and food systems. The course integrates data analysis with data collection activities in LFS250, 350, and 450. Students will also learn statistical techniques and software, which will allow them to conduct more rigorous analysis of data for upper-level courses throughout the Faculty of Land and Food Systems. Students will learn Microsoft Excel for data analysis during Lectures and will learn R statistical software to analyze statistical data during tutorials.

**Learning Objectives:**

- Organize and interpret scientific and social data related to agriculture, food, and the environment.
- Assess and interpret statistical results presented in relevant scientific literature.
- Select and apply appropriate statistical measures and techniques.
- Identify appropriate measures and techniques, including basic statistics that can be used to evaluate aspects of agri-food systems.
- Critique statistical measures and derived conclusions.
- Become proficient in both R and Excel to conduct statistical analysis.

**Open Labs:**

Open Labs are optional drop-in sessions held by TAs to answer questions regarding course content, problem sets, assignments and exam preparation. If you are needing help in the course, please attend one of the 15 hours of Open Lab times scheduled each week. Please see the front page of Canvas for the weekly schedule.

**R Tutorials:** Normally, this course would provide a mandatory weekly in-person R Tutorials but given that classes have started this semester online and there is a good deal of uncertainty of what happens in the future, all in-person mandatory attendance for R Tutorials are cancelled. In its place, learning content of R software will be provided each week via videos along with complementary exercises.

## **Learning Management System and Communication**

- Canvas (<http://canvas.ubc.ca>) will be used for all course content delivery
- For the first 2 weeks of this course, you are required to use a Zoom account during synchronous classes, Open Labs and Office hours. If you do not have a Zoom account, you can create one here: <https://zoom.us/signup>. Please use the Zoom link on the front page of Canvas to access Open Labs, Office Hours, Synchronous classes, etc.
- ***Canvas Notifications and Student email addresses will be used for communicating information and disseminating class materials. It is your responsibility to check your email and the Canvas course website frequently.***
- Students are required to have a functioning web camera and microphone while the course is being delivered remotely.

## **Grading<sup>1</sup>:**

Assignments	17%
Team-Based Final Project	18%
Midterm Exam	25%
Final Exam	40%
	<u>100%</u>

<sup>1</sup> **Note:** This grading scheme assumes that examinations will take place in person. If this course changes to remote delivery during examination weeks, the grading scheme will likely be modified, and notification will be provided before any examination.

**Required Textbook:** Access Code for “**WileyPlus Next Gen Business Statistics**” by Black 3rd Canadian edition (\$80.50). Please note that this is a **required textbook and must be purchased**. ***The access code will provide you access to an e-textbook and WileyPlus that is an online system for assignments and problem sets.*** ISBN: 9781119658221. **Go to the UBC bookstore to purchase your access code and register for the course materials using instructions provide on page 6 of this course outline.** To purchase this, go to: <https://shop.bookstore.ubc.ca/courselistbuilder.aspx> and find the course number (LFS 252 002 – Michael Johnson).

**Required Calculator:** Sharp EL 531 XBWH (or equivalent). <https://shop.bookstore.ubc.ca/p-45039-calculator-sharp-el-531xbwh-scientific-calculator.aspx>. This costs \$19.95 in the UBC bookstore. **Please Note:** Any calculator can be used in this course providing it can perform simple linear regression (least squares method or two-variable statistics). All descriptive statistics and regression lectures will be taught using the Sharp EL 531. **Note: Programmable calculators are not allowed during exams!**

**Required Software:** Microsoft Excel and the Analysis Toolpak Addin will be used during lectures. Please make sure to sign up for Microsoft 365 for free at: <https://it.ubc.ca/services/desktop-print-services/software-licensing/microsoft-365-students> This is particularly important for Mac users to ensure that you have Microsoft 365 to ensure that your Excel version is equivalent to that of the PC version.

**Communication and Extra Help:** The best way to get extra help in this course is through Open Labs or Office hours. If you have questions regarding content (e.g., problem sets, assignments, exam prep) please use the dedicated Open Labs and Office Hours times. If you have a question regarding course administration, etc. please be sure to direct your question to Mike.

**Assignments:** There will be approx. 5-6 assignments given over the course. One of these assignments will be carried out in a team of two or three people (details tba) and will constitute a larger weight (~5%) of your assignment grade. The vast remainder of the assignments weight (~12%) will be carried out using an online system called **WileyPlus**. **WileyPlus is mandatory for course assignments (it comes with the required textbook).** You will require the Access Code that comes with your e-textbook to register for WileyPlus.

**Policies:** Late assignments will **not** be accepted for marking. Assignments must be done on an **individual basis unless otherwise specified by the instructor**. **Discussion and collaboration among students is strongly encouraged, but on individual assignments, each student must submit his or her own original work. Identical submissions are a form of academic dishonesty (please see next page “Academic Misconduct”).**

**Midterm Exam:** **Thursday Feb 17<sup>th</sup> (During Class ) – 1 Hour and 20 Minutes**

**Final Exam:** date tba. **The final exam will focus on material after the midterm.**

**Makeup Exams / Late Assignments:** There will be **NO** makeup exams / or assignments. **If you miss an exam/assignment, you will receive zero marks.** Exceptions may be made for documented medical reasons or extenuating circumstances. In this case, it is the responsibility of the student to inform the instructor immediately. **Notification after the examination date (or an assignment due date) is not acceptable and will result with a grade of zero.**

**All exams are “closed-book”. That is, you will NOT be allowed to use your textbook or notes. Formulas will be provided on the front page of the exam. UBC STUDENT PHOTO ID is required in order to write any exam.**

### **Copyright**

All learning materials of this course (videos, course handouts, lecture slides, assessments, 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. Audio or video recording of classes are not permitted without the prior approval of the Instructor. Any lecture video and recordings are for the sole use of the instructor and for students currently enrolled in this class. In no case may the lecture video or recording (or other learning materials), or part of the recording be used by students or any other person 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.

I am the exclusive owner of copyright for materials (lecture videos, course handouts, lecture slides, assessments, etc.) in this class. You may take notes and make copies of course materials for your own use. You may not and may not allow others to reproduce or distribute (or upload) lecture notes and course materials publicly whether or not a fee is charged without my express written consent. Similarly, you own copyright in your original papers and essays. If I am interested in posting your answers or papers on the course web site, I will ask for your written permission.

### **Academic misconduct**

Academic honesty is essential to the continued functioning of The University of British Columbia as an institution of higher learning and research. All UBC students are expected to behave as honest and responsible members of an academic community. Breach of those expectations or failure to follow the appropriate policies, principles, rules, and guidelines of the University with respect to academic honesty may result in disciplinary action.

**Academic misconduct** that is subject to disciplinary measures includes, but is not limited, to the following:

- **Plagiarism**, which is intellectual theft, occurs where an individual submits or presents the oral or written work of another person as his or her own. In many UBC courses, you will be required to submit material in electronic form.
- **Cheating**, which may include, but is not limited to falsification of any material subject to academic evaluation, unauthorized collaborative work; or use of unauthorized means to complete an examination.
- **Submitting others work as your own**, may include but not limited to i. using, or attempting to use, another student's answers; ii. providing answers to other students; iii. failing to take reasonable measures to protect answers from use by other students; or iv. in the case of students who study together, submitting identical or virtually identical assignments for evaluation unless permitted by the course instructor.
- **Resubmission of Material**, submitting the same, or substantially the same, essay, presentation, or assignment more than once (whether the earlier submission was at this or another institution) unless prior approval has been obtained from the instructor(s) to whom the assignment is to be submitted.
- **Use of academic ghostwriting services**, including hiring of writing or research services and submitting papers or assignments as his or her own.

**Student Responsibility**: Students are responsible for informing themselves of the guidelines of acceptable and non-acceptable conduct for examinations; syllabus instructions; and UBC academic misconduct policies. Review the following web sites for details:

- UBC Academic Misconduct and Discipline  
(<http://www.calendar.ubc.ca/Vancouver/index.cfm?tree=3,54,111,0>)
- UBC Learning Commons web-based Academic Integrity  
(<http://learningcommons.ubc.ca/academic-integrity/>).

**Course Schedule** (Please NOTE: this is a **TENTATIVE COURSE SCHEDULE** subject to changes in terms of content and timing. No changes will be made to the exam dates without proper notification).

Week	Topic	Textbook Reference
1 Jan 10	<b>Introduction:</b> Statistics in LFS, course overview. <b>Descriptive Statistics:</b> Measures of location (mean, median, mode and weighted mean).	<b>Chapt 1</b>
2 Jan 17	<b>Descriptive Statistics Continued:</b> Measures of dispersion (range, variance, standard deviation). The coefficient of variation and. Covariance. Z scores, Chebyshev's theorem, Empirical rule, Boxplots and shapes of distributions. Microsoft Excel – ToolPak Descriptive Statistics, and Histograms.	<b>Chapt 3</b>
3 Jan 24	<b>Descriptive Statistics Continued:</b> Frequency distributions and graphs (bar chart, pie chart, pareto, stem and leaf, histogram and ogive). Microsoft Excel – Pivot Tables	<b>Chapt 2</b>
4 Jan 31	<b>Introduction to Probability</b> - Experiments, counting rules (combinations, permutations and tree diagrams), and assigning probabilities. <b>Probability:</b> Events and their probabilities, probability relationships/laws.	<b>Chapt 5</b>
5 Feb 7	<b>Probability Tables:</b> Probability Laws/Conditional Probability ( <b>Chapt 5</b> ) <b>Discrete probability (Chapt. 7):</b> Random variables, expected value and standard deviation. <b>Binomial probability distribution.</b>	<b>Chapt 7</b>
6 Feb 14	<b>Midterm Exam: Thurs Feb 17th (During Class)</b>	
	<b>No Classes – Reading Break (Feb 21-25)</b>	
7 Feb 28	<b>Normal probability distribution (Chapt 8).</b> Normal approximation to the binomial distribution (only if time permitting). <b>Sampling (Chapt 9):</b> Point estimation, sampling distribution of the sample means, central limit theorem.	<b>Chapt 8 and 9</b>
8 Mar 7	<b>Interval Estimation:</b> Estimation of population means when sigma is known and unknown. Sample size calculations. <b>Interval Estimation:</b> Estimation of population proportions and sample size calculations.	<b>Chapt 10</b>
9 Mar 14	<b>Intro. to Hypothesis Testing:</b> Null and alternate hypotheses. Type I, Type II errors. <b>Hypothesis Testing:</b> One and two tailed tests about a population mean (sigma known and unknown). P-values. One and two-tailed tests about a population proportion.	<b>Chapt 11</b>
10 Mar 21	<b>Hypothesis Testing (t tests):</b> Comparing the means of two independent populations (or related populations). <b>One-way Analysis of Variance (ANOVA).</b> <b>Chi-square Tests (Chapt 15):</b> Test of independence, contingency tables.	<b>Chapt 12</b>
11 Mar 28	<b>Regression Analysis:</b> Simple regression model, least square method, coefficient of determination, assumptions. <b>Regression Analysis:</b> Testing for significance. Using the regression equation for estimation and prediction.	<b>Chapt 14</b>
12 April 4	<b>Poster Presentations (Project Due): Due Tuesday April 5<sup>th</sup></b>	
	<b>Final Exam – TBA</b>	