



BUSI 5981

Statistics for Business Research

Fall 2023

Please read this course outline. Unless you, the student, inform the instructor by the first class otherwise, it is assumed that you understand and agree to the terms specified in this course outline.

Instructor: Ernest Kwan
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Office hours: Thu. 7:45-8:45 PM on Zoom, <https://carleton-ca.zoom.us/j/8052504786>
Class meeting: Mon. 11:35-2:25 in 4022 Nicol; starts Sept. 11

1. Course description

This course provides an in-depth examination of statistical inference. Are there fundamental problems or misconceptions that underlie the data analysis conducted by researchers? If so, how could researchers improve their application of statistics? By addressing such questions, students acquire the necessary foundation to the study of various statistical methodologies. This course also gives a detailed examination of regression – a statistical model based on which many other analysis techniques (encountered in BUSI 6905) are derived. A list of topics appears on the next page. (Course description from university calendar: In-depth examination and critique of statistical inference. Linear regression. Statistical computing software will be used.)

2. Course objectives

This course is designed especially for students that conduct quantitative research. So, in addition to statistical concepts, the key learning goals are:

1. To understand the role of statistics in quantitative research
2. To distinguish theory and hypothesis evaluation from statistical evidence
3. To appreciate the importance of effect size estimates
4. To recognize flawed or inadequate statistical evidence

3. Course prerequisite

No prior statistics course is required, but students are expected to know mathematical operations and some algebra.

4. Brightspace

Brightspace is used for distribution of material. Grades are posted on Brightspace as soon as they become available.

5. Communicating with Ernest outside of class

Email is the fastest way of reaching Ernest outside the class. Ernest will do his best to reply within 48 hours during the school term.

6. Evaluation breakdown

Assignments	50%
Test 1	25%
Test 2	25%

7. Schedule of events (tentative)

Week	Topics
1 – Sep. 11	Lecture
2 – Sep. 18	Lecture / Assignment 1 is due.
3 – Sep. 25	Lecture / Assignment 2 is due.
4 – Oct. 2 *	Lecture / Assignment 3 is due.
Oct. 9	No class (Thanksgiving)
5 – Oct. 16	Lecture
Oct. 23	No class (Reading week)
6 – Oct. 30	Lecture
7 – Nov. 6	Test
8 – Nov. 13	Lecture
9 – Nov. 20	Lecture
10 – Nov. 27	Lecture / Assignment 4 is due.
11 – Dec. 4	Lecture / Assignment 5 is due.
12 – Dec. 11	Test

* Ernest is away on Oct. 2; that lecture will take place on an alternate day. More information will be given in class.

8. Lectures

Unless noted otherwise, lectures are in person.

9. List of topics (tentative)

Describing a variable: Central tendency, variability, shape • Plotting a variable: Line-up plot, bar graph, histogram, stem-and-leaf, boxplot • Logic and statistics: Ad hominem fallacies • A normal variable • Types of distributions: Population distribution vs. sampling distribution • Central limit theorem • Transforming a variable / Standardizing a variable • Pearson correlation • Fisher z transformation: Confidence interval and significance tests on the Pearson correlation • Estimation / Confidence intervals • Null hypothesis significance testing (NHST) • Factors that influence power • t distributions • Independent / dependent groups t test • Effect sizes • Logic and statistics: Modus ponens and modus tollens • NHST: 2 fundamental problems, 9 misuses and misconceptions • Formal responses to the NHST controversy: Task Force on Statistical Inference • Theory testing and the scientific method • Theory testing and NHST • Simple linear regression (SLR) • F distributions • SLR: Effect size • SLR: Significance testing • SLR: Confidence band vs. prediction interval • SLR: Three formal assumptions and two implicit claims • SLR: Lack of fit test • What are outliers (two definitions) and how to deal with them • SLR: Influence indices • SLR: 5 types of residuals • Weighted least squares regression • Locally weighted least squares regression • Curvilinear regression

10. Assignments

Assignments involve topics from the course. Solutions are based on material you, the student, have learned. You are not expected to use additional resources to do assignments, instead please review your lecture notes. Accordingly, assignments are intended to solidify your understanding of the course material. Work on assignments on your own, do not collaborate with others. If you need help with assignments, please attend the office hours. Because solutions are posted after the assignment deadline, late assignments are not accepted (i.e., get a mark of 0). **Assignments are due at the beginning of class, 11:35 AM, on their due date.**

11. Missed tests

If a student misses a test and would like a make-up test, please follow these steps:

- a. Inform Ernest (by email) of the inability to write the test no later than 24 hours after the missed test is distributed.
- b. In the same email suggest possible dates for a make-up test; note the make-up test must occur within 6 calendar days of the missed test.
- c. Provide Ernest with the appropriate document(s) to support the original absence.

Incompliance to these steps leads to a test mark of 0. A make-up test may be granted when the absence is supported by a medical certificate or appropriate document. A make-up test is not granted for students who have made travel arrangements that conflict with test schedule. It is the responsibility of the student to accommodate the School's availability for a make-up test. Note these procedures apply only to the original test; failure to write a make-up test results in a test mark of 0.

12. Evaluation of submitted work

Given the volume of marking and the need to provide timely feedback, grossly disorganized or illegible work (e.g., assignments) creates unnecessary demands on the grader. The grader has the option to disregard such work and assign a mark of 0; subsequent re-submission will not be accepted, and such work does not qualify for reappraisal.

13. Mark reappraisal

If a student would like the grader to reappraise a mark, please inform Ernest by email within 6 calendar days of receiving the mark. This email must explain the disagreement with the original evaluation; this explanation will be given to the grader as part of the reappraisal. Requests that pass the deadline will not be accepted (this deadline ensures timely processing and release of grade-related information, such as the class average). The grader will reappraise the work subject to his/her original commitments. A reappraisal could lead to a downward adjustment (i.e., lowering of original mark) if the submitted explanation demonstrates a misunderstanding of the relevant concepts. Students are thus encouraged to review available solutions prior to requesting a reappraisal.

Contribution to Learning Goals of the Program (MSc):

Program Learning Goal	Competencies Not Covered	Competencies Introduced (only)	Competencies Taught But Not Assessed	Competencies Taught and Assessed
MS1 Research Knowledge <i>Graduates will have an understanding of research philosophies, designs, methodologies and techniques foundational to conducting academic research in management.</i>			X	
MS2 Scholarly Management Research <i>Graduates will be able to conduct scholarly research on issues facing organizations</i>	X			
MS3 Communication <i>Graduates can communicate complex ideas, research activities and results.</i>			X	
MS4 Professional Activities <i>Graduates will engage with professional organizations or networks in academia or practice.</i>	X			

ADDITIONAL INFORMATION

Course Sharing Websites:

Materials created for this course (including presentations and posted notes, labs, case studies, assignments, and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

Recommended Calculator for Examinations:

If you are purchasing a calculator, we recommend any one of the following options: Texas Instruments BA II Plus (including Pro Model), Hewlett Packard HP 12C (including Platinum model), Staples Financial Calculator, Sharp EL-738C & Hewlett Packard HP 10bII

Letter Grades:

In accordance with the Carleton University Undergraduate Calendar (p 34), the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100 B+ = 77-79 C+ = 67-69 D+ = 57-59 F = Below 50
 A = 85-89 B = 73-76 C = 63-66 D = 53-56
 A - = 80-84 B - = 70-72 C - = 60-62 D - = 50-52

Grades entered by Registrar:

WDN = Withdrawn from the course
 DEF = Deferred

Academic Regulations:

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

<http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>

Requests for Academic Accommodation:

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

- **Pregnancy**
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>
- **Religious Obligations**
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>
- **Students with Disabilities**
If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. <https://carleton.ca/pmc/>
- **Survivors of Sexual Violence**
As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and its survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/sexual-violence-support/>
- **Student Activities**
Carleton University recognizes the substantial benefits, to both the individual student and the university, that result from participating in activities beyond the classroom experience. Reasonable accommodation will be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

For more information on academic accommodation, please contact the departmental administrator or visit: <https://students.carleton.ca/course-outline/>

Academic Integrity:

Violations of academic integrity—presenting another’s ideas, arguments, words or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student—are a serious academic offence, weaken the quality of the degree, and will not be tolerated. Penalties may include; a grade of Failure on the submitted work and/or course; academic probation; a refusal of permission to continue or to register in a specific degree program; suspension from full-time studies; suspension from all studies at Carleton; expulsion from Carleton, amongst others. Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy, which is available, along with resources for compliance at: <https://carleton.ca/registrar/academic-integrity/>

Centre for Student Academic Support:

The Centre for Student Academic Support (CSAS) is a centralized collection of learning support services designed to help students achieve their goals and improve their learning both inside and outside the classroom. CSAS offers academic assistance with course content, academic writing and skills development. Visit CSAS on the 4th floor of MacOdrum Library or online at: <https://carleton.ca/csas/>

Other Important Information:

- Students must always retain a hard copy of all work that is submitted.
- All final grades are subject to the Dean’s approval.
- For us to respond to your emails, we need to see your full name, CU ID, and the email must be written from your valid CARLETON address. Therefore, in order to respond to your inquiries, please send all email from your Carleton cmail account. If you do not have or have yet to activate this account, you can do so by visiting <https://carleton.ca/its/get-started/new-students-2/>