

**Faculty of Health
Department of Psychology
PSYC 2020E: STATISTICAL METHODS I AND II
Friday 11:30am – 2:30pm
Vari Hall 1152A**

This course will be delivered using a *flipped classroom approach*. This approach involves both asynchronous (pre-recorded) and synchronous, in-person components. Students are responsible for watching pre-recorded lectures that deliver instruction of course material. Students are also responsible for attending twice weekly in-person classes during which they can ask questions about the pre-recorded lecture content and content knowledge will be applied through the completion of learning activities and iClicker questions; support and feedback will be provided from instructor and teaching assistant during in-person class time. **Students are expected to have watched the pre-recorded lecture(s) each week before attending the corresponding in-person class.**

For more information about what to expect in a flipped classroom and the benefits of this approach, watch this [2.5 minute video!](#)

Students are expected to spend **an average of 6 to 8 hours per week** on this course, including the time spent watching pre-recorded lectures, attending in-person classes, completing review & practice problems and activities, and biweekly Apply Its. Completing assignments and studying for tests will require additional time around their respective deadlines.

Instructor and T.A. Information

Instructor: Dr. Jodi Martin

Office Hours: By appointment (see Communications & Contact Info folder on eClass to book)

Email: jodimart@yorku.ca

T.A.	Jennifer Ruttle
Email	jeruttle@yorku.ca
Office Hours	Wednesdays 11am – 12pm (see Communications & Contact Info folder on eClass to book)

****ALL OFFICE HOURS WILL BE HELD AS ZOOM MEETINGS UNLESS SPECIAL ARRANGEMENTS ARE MADE. A ZOOM LINK WILL BE PROVIDED WHEN YOU BOOK AN APPOINTMENT****

When sending emails to the teaching team please include “PSYC2020E” in the subject line and your full name somewhere in the email.

Course Prerequisite(s): Course prerequisites or co-requisite are strictly enforced

- HH/PSYC 1010 6.00 (Introduction to Psychology), with a minimum grade of C.

Course Credit Exclusions

Please refer to [York Courses Website](#) for a listing of any course credit exclusions.

Course website: [eClass](#)

All course materials will be available through eClass. This includes important details about the course format & schedule, weekly pre-recorded lecture videos & slides, Q&A submissions for each week's class, tests, review & practice problems, Apply It and assignment instructions and submissions, and appointment sign-ups for instructor & TA office hours. Important communications from instructor to students will take place through eClass's Course Announcements.

It is absolutely necessary that you regularly access eClass to be successful in this course. "I didn't know it was on eClass" or "I don't know how to use eClass" are not acceptable excuses for missing any course component. It is the students' responsibility to review and become comfortable with using eClass for the purposes of this course.

Course Description

Statistical literacy is an important skill obtained through an undergraduate education in psychology. This course introduces students to the basic concepts of both descriptive and inferential statistics. We will take a hands-on, skills-based approach aimed at facilitating students' understanding of the use and interpretation of various statistical methods. Students will obtain both conceptual and applied knowledge in a range of topics including data visualization, central tendency and variability, probability and sampling distributions, hypothesis testing, and effect sizes as well as both parametric and non-parametric statistical methods. Students will gain hands-on data management and analytic experience working with data by using software (jamovi, R) to run statistical analyses and by interpreting their results.

Program Learning Outcomes

Upon completion of this course, students should be able to:

1. Compute descriptive statistics and inferential statistics.
2. Interpret and report the results of descriptive statistics and inferential statistics.
3. Distinguish between the role of descriptive statistics and inferential statistics.
4. Compute inferential statistics for univariate linear models (ANOVA, regression).
5. Interpret and report the results of inferential statistics for univariate linear models.
6. Recognize the limits of inferential statistics.

Topics Covered

- Defining Key Statistical Terms
- Frequency Distributions
- Central Tendency

- Variability
- z-Scores/Normal Distribution
- Probability
- Sampling Distribution
- Confidence Intervals
- Power
- Effect Size
- Hypothesis Testing
- Correlation (Pearson at minimum)
- χ^2 Goodness of Fit
- χ^2 Test of Independence
- One-sample t test
- Independent samples t-test
- Dependent samples t-test
- Review of basic statistical concepts
- One-way Independent Groups ANOVA (with contrasts)
- Two-way Independent Groups ANOVA (with interaction and contrasts)
- One-way Repeated Measures ANOVA (with contrasts)
- Simple Regression
- Multiple Regression
- **Effect size is included as part of all inferential statistics covered in this course.*

Specific Learning Objectives

1. Compare and contrast descriptive and inferential statistics.
2. Provide examples of the different scales of measurement.
3. Summarize, organize, and present the essential features of different data types numerically and graphically.
4. Calculate relevant descriptive statistics such as measures of central tendency and variability for different types of variables.
5. Generate research questions and statistical hypotheses (i.e., null and alternative) for different research scenarios.
6. Explain the process underlying hypothesis testing and how researchers use this process to test hypotheses and answer research questions.
7. Conduct and interpret the results of various statistical tests using statistical software (jamovi).
8. Demonstrate general knowledge of the software, R, and its use for statistical analysis.

Required Software & Recommended Texts

Students are **required** to download the “solid” version of jamovi (version 2.2.5) from www.jamovi.org. This software is required for students to complete activities, Apply Its, and assignments in the course. Students are advised to download this software as soon as possible to be prepared for the start of the course.

Students are also **required** to download iClicker Reef (available through the iOS or Google Play Store, or at app.reef-education.com for non-mobile users) to participate during in-person classes. More information on how to enrol in this course through iClicker Reef is available in the “In Class Participation” folder on eClass.

Students should expect to bring a laptop to weekly in-person classes in order to complete the applied activities that may require you to use jamovi. If you do not have your own laptop, no worries, you can “buddy up” with someone who does to complete learning activities.

There is no required text for this course. Activities and opportunities for practice will be provided to you in pre-recorded lectures, weekly in person classes, and through eClass. You can consider the following FREE texts available to download online to supplement your learning in the course. **If you use one of these books, keep in mind that all tests, Apply Its and Assignments will be evaluated based on the content delivered through lectures and classes, not content of the texts** (they are just for additional optional support).

1) <https://www.learnstatswithjamovi.com/>

This book covers intro to statistics while also giving a lot of supplemental learning on using jamovi. Although this book goes far more in depth on some topics than is needed for this course, I would recommend it to supplement the application of your learning using jamovi, but also refer to the jamovi materials posted on eClass if you find this book too dense or intimidating.

2) <https://open.umn.edu/opentextbooks/textbooks/an-introduction-to-psychological-statistics>

This book covers general conceptual knowledge of statistics.

You can also consider the following options for **PAID** hard copy or e-books as optional supplemental material for the course:

1) Gravetter, F. J., & Wallnau, L. G. *Statistics for the behavioural sciences*. Belmont, CA: Wadsworth, Cengage Learning. (8th through 11th editions would be fine)

2) Howell, D.C. (2016). *Fundamental statistics for the behavioral sciences* (9th ed). Wadsworth Publishing, Cengage Learning.

Please note that if you purchase a textbook thinking it is required you may not be able to return it. Before buying the book, make sure you are aware of the seller’s refund policy.

Course Requirements and Assessment:

Assessment	Date of Evaluation (if known)	Weighting
In-class Participation	Weekly	5%
R Tutorials	January 15 th	3%
Test 1	October 21 st	12%
Test 2	November 25 th	12%
Test 3	February 17 th	12%
Test 4	March 31 st	12%
Apply Its (x8)	Biweekly (see Course Schedule)	16%
Assignment 1	December 7 th	14%
Assignment 2	April 11 th	14%
Total		100%

Description of Assignments

Participation

Students can earn participation points by responding to iClicker questions during weekly in person classes, up to a possible total of 5% of your final grade. All students will get 2 “freebie weeks” per semester making space for missing two class’ worth of iClicker with no penalty. Completing iClicker questions will provide students important opportunities to check in on their knowledge/understanding of course content and practice in preparation for course tests. More information about using iClicker for this course will be available in the “In Class Participation” folder on eClass.

R Tutorials

Up to 3% participation points can be earned by completing a series of three (3) online tutorials introducing students to the statistical software, R. This software is used in upper year undergraduate statistics courses in the department and in most graduate school programs. Skills in using R are also highly coveted by some employers so can be useful even to those students with no intention of going to graduate school. These tutorials will build on skills and knowledge you will acquire in this course and will prepare you with additional analytical skills for performance in future courses and beyond. Participation points will be awarded for their completion. More information on how to access the tutorials will be posted in the “R Tutorials” folder on eClass.

Apply Its

Students will complete eight (8) Apply Its throughout the course. These are brief low-stakes assignments (worth 2% each) that assess students’ ability to apply course content to new situations, contexts, and data, and will scaffold skills required to complete the higher stakes end of term assignments. **Apply Its can be completed individually or in pairs (groups of 2) should students prefer a team approach.** Apply Its will be due during a 4-day submission window (see

Course Schedule below). The first day of each window is the deadline for a given Apply It and the remaining 3 days are a built-in extension should it be needed; additional extensions will not be provided. Completing Apply Its will typically require students to use the statistical software, jamovi. **Students will receive feedback on Apply Its that will aid them in completing the larger summative assignments.** More information will be provided on eClass in the “Apply Its” folder and during in person classes.

Tests

Students will complete four (4) in person tests throughout the course; two in the Fall and two in the Winter. Tests will take place during our weekly scheduled class time. Each test will be non-cumulative based on content from preceding classes and will focus on students’ conceptual and interpretive knowledge of statistics. More information about each test will be provided during class time. Students should be prepared to bring photo ID to each test (preferably a YorkU student card).

Assignments

Students will complete two summative (end of term) assignments in this course. Assignments will be completed individually. These assignments assess students’ conceptual understanding of course materials as well as their ability to apply knowledge through the conducting and interpreting of statistical analysis of data using jamovi. **Each assignment is cumulative across its semester and will require knowledge and skills developed throughout all preceding course modules.** More information will be released about each assignment on eClass. Instructions, data, and submission links for both assignments will be accessible through eClass.

Note: Assignment instructions will be provided well in advance of deadlines. It is recommended that students start assignments early and work on them gradually throughout the course as they gain the knowledge to do so.

Class Format and Attendance Policy

Course content will be delivered through pre-recorded content lectures posted on eClass which students will watch on their own time AND through in-person class held each week. In-person classes will be spent on Q&A about content from the pre-recorded lecture, opportunities to apply course content through learning activities with the instructor and TAs available to provide feedback and guidance, and iClicker practice questions.

Students are expected to watch pre-recorded lecture(s) corresponding to each in-person class before the in-person class takes place in order to benefit from the scheduled activities. If an in person class is missed, students are likewise expected to review the material and activities that took place on their own time to ensure the same learning experience.

Grading as per Senate Policy

The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and tests* will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 89, B+ = 75 to 79, etc.)

For a full description of York grading system see the York University Undergraduate Calendar – [Grading Scheme for 2022-23](#)

Missed Tests/Midterm Exams/Late Assignment

Missed Tests

All tests will be completed in person. Student MUST complete the Missed Test form found on eClass within 48 hours of the original test date in the event of a missed test. Failure to complete the form within 48 hours of the original test dates will result in a grade of 0 for the missed test. At this time, due to COVID-19 an Attending Physician's Statement (APS) is not required, however, a reason or explanation for missing a test must be provided.

Once you have notified us of a missed test a TA will contact you with the date of a make up test; **all make up tests will be completed in person.** If you miss the scheduled make up test, you must again complete the Missed Test form with a reason and the weighting of the missed test will be redistributed across the remaining tests in the course.

Late Apply Its

Apply Its that are not submitted during the 4-day submission window will receive a grade of 0 and no extensions will be granted, except in extreme circumstances. Apply It deadlines each span a 4-day submission window, which acts as built-in extra time for their completion. This does not mean that the final day of a submission window is the actual deadline, rather, the first date in the window is the deadline and the remaining three days are a built-in extension should it be needed.

Late Assignments

Both assignments have a 2-day grace period where students can submit after the deadline at no penalty. Assignments submitted beyond this 2-day grace period will receive a 5% per day penalty up to a total of 3 days (i.e., up to 5 days after original due date). No assignments will be accepted 5 days beyond their due date; assignments more than 5 days late will receive a grade of 0.

Example: The deadline for Assignment 1 is December 7th at 11:59pm. If additional time is needed (due to falling behind in the course, having a lot of deadlines around then,

excessive perfectionism, etc.), students can submit Assignment 1 with no late penalty until December 9th at 11:59pm (you do not have to notify the teaching team to take advantage of the 2-day grace period). Assignments submitted December 10th, 11th, or 12th will receive a 5% per day late penalty (e.g., 5%, 10%, 15% penalty, respectively). If a student has not submitted Assignment 1 by December 12th at 11:59pm they will receive a grade of 0.

This policy holds for all both Assignment 1 and Assignment 2 and their respective deadlines.

Exceptions to this policy can be made for truly exceptional circumstances – should you think you have such a circumstance please email the instructor as soon as possible (i.e., before the deadline and definitely before the end of the 2-day grace period) to discuss.

Add/Drop Deadlines

For a list of all important dates please refer to: [Fall/Winter 2022-23 Important Dates](#)

	Fall (Term F)	Year (Term Y)	Winter (Term W)
Last date to add a course without permission of instructor (also see Financial Deadlines)	Sept. 20	Sept. 20	Jan. 22
Last date to add a course with permission of instructor (also see Financial Deadlines)	Oct. 4	Oct. 25	Feb. 6
Drop deadline: Last date to drop a course without receiving a grade (also see Financial Deadlines)	Nov. 11	Feb. 10	Mar. 17
Course Withdrawal Period (withdraw from a course and receive a grade of "W" on transcript – see note below)	Nov. 12 - Dec. 7	Feb. 11 - April 11	March 18 - April 11

Add and Drop Deadline Information

There are deadlines for adding and dropping courses, both academic and financial. Since, for the most part, the dates are **different**, be sure to read the information carefully so that you understand the differences between the sessional dates below and the [Refund Tables](#).

You are strongly advised to pay close attention to the "Last date to enrol without permission of course instructor" deadlines. These deadlines represent the last date students have unrestricted access to the registration and enrolment system.

After that date, you must contact the professor/department offering the course to arrange permission.

You can drop courses using the registration and enrolment system up until the last date to drop a course without receiving a grade (drop deadline).

You may [withdraw from a course](#) using the registration and enrolment system after the drop deadline until the last day of class for the term associated with the course. When you withdraw from a course, the course remains on your transcript without a grade and is notated as 'W'. The

withdrawal will not affect your grade point average or count towards the credits required for your degree.

Electronic Device Policy

This course requires students to have access to a laptop during in-person sessions in order to work on learning activities using statistical software; students who do not have their own laptop can “buddy up” with a classmate for these purposes. Students will also need access to a computer and Internet connection to watch pre-recorded content lectures through eClass in advance of weekly in-person classes.

Any sharing of screenshots and/or personal feedback received from completing course assessments will be considered a violation of the electronic device policy and there will be consequences for this behaviour. The unauthorized sharing of these details or any other course materials by any means (e.g., What’s App group, student forum, Reddit, Facebook group etc.) is strictly prohibited.

Academic Integrity for Students

York University takes academic integrity very seriously; please familiarize yourself with [Information about the Senate Policy on Academic Honesty](#).

It is recommended that you review Academic Integrity by completing the [Academic Integrity Tutorial](#) and [Academic Honesty Quiz](#)

Test Banks

The offering for sale of, buying of, and attempting to sell or buy test banks (banks of test questions and/or answers), or any course specific test questions/answers is not permitted in the Faculty of Health. Any student found to be doing this may be considered to have breached the Senate Policy on Academic Honesty. In particular, buying and attempting to sell banks of test questions and/or answers may be considered as “Cheating in an attempt to gain an improper advantage in an academic evaluation” (article 2.1.1 from the Senate Policy) and/or “encouraging, enabling or causing others” (article 2.1.10 from the Senate Policy) to cheat.

Course Group Chats

Participating in group chats other than the Student Forum on eClass (e.g., What’sApp, Discord, Reddit, SnapChat, etc.) in the interest of forming a course community that is solely for the students is permitted, but students should proceed with caution for the following reasons:

1. The professor, teaching assistants, department and York University overall have no jurisdiction over adverse behaviours (e.g., hacking, bullying, etc.) that may occur in these contexts. That means that it is difficult if not impossible for the professor to intervene if an unsafe situation arises. If such an event occurs, students are advised to shut down the group and form a new one. To reduce the risk of external individuals

joining a course chat group please only share links to the group through private means (i.e., don't post the link publicly on Reddit!) and share only with other members of this course.

2. Participation in illicit activity (e.g., cheating) that occurs in such groups may put your academic integrity at risk. Sharing of answers or asking for an answer on a graded course components through such a group chat is considered an act of academic dishonesty and is strictly prohibited. Any violations will be reported to the Department of Psychology and are subject to consequences (e.g., a failing grade on the assessment in question, a grade of 0 on the particular assessment, a failing grade in the course, etc.).
3. The sharing of screenshots of emails or answers provided by the professor or other members of the teaching team through emails is not permitted in course community group chats. All email communications between student and professor/teaching team are considered private and should not be shared without express permission from the professor/teaching team.

Academic Accommodation for Students with Disabilities

While all individuals are expected to satisfy the requirements of their program of study and to aspire to do so at a level of excellence, the university recognizes that persons with disabilities may require reasonable accommodation to enable them to do so. The university encourages students with disabilities to register with Student Accessibility Services (SAS) to discuss their accommodation needs as early as possible in the term to establish the recommended academic accommodations that will be communicated to Course Directors as necessary. Please let me know as early as possible in the term if you anticipate requiring academic accommodation so that we can discuss how to consider your accommodation needs within the context of this course. <https://accessibility.students.yorku.ca/>

Excerpt from Senate Policy on Academic Accommodation for Students with Disabilities

1. Pursuant to its commitment to sustaining an inclusive, equitable community in which all members are treated with respect and dignity, and consistent with applicable accessibility legislation, York University shall make reasonable and appropriate accommodations in order to promote the ability of students with disabilities to fulfill the academic requirements of their programs. This policy aims to eliminate systemic barriers to participation in academic activities by students with disabilities.

All students are expected to satisfy the essential learning outcomes of courses. Accommodations shall be consistent with, support and preserve the academic integrity of the curriculum and the academic standards of courses and programs. For further information please refer to: [York University Academic Accommodation for Students with Disabilities Policy](#).

Course Materials Copyright Information

These course materials are designed for use as part of the PSYC2020 course at York University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

Copying this material for distribution (e.g. uploading material to a commercial third-party website) may lead to a violation of Copyright law. [Intellectual Property Rights Statement](#).

Course Schedule

FALL SEMESTER			
Week	Live Mtg Date	Topic	What's due when?
1	Sept 9	Course Overview	(suggested BONUS Course Outline Quiz)
2	Sept 16	Introduction to Statistics	(suggested R tutorial 1)
3	Sept 23	Examining Data: Tables & Figures	Apply It 1 (Sept 23 – 26)
4	Sept 30	Measures of Central Tendency & Variability	(suggested R tutorial 2 & 3)
5	Oct 7	z-scores & the Normal Distribution	Apply It 2 (Oct 7 – 11)
		FALL READING WEEK	
6	Oct 21	Test 1	
7	Oct 28	Probability & Intro to Hypothesis Testing	
8	Nov 4	Errors in Hypothesis Testing, Statistical Power, & Effect Size	Apply It 3 (Nov 4 – 7)
9	Nov 11	One-sample t-test	
10	Nov 18	Independent & Dependent Sample t-tests	Apply It 4 (Nov 18 – 21)
11	Nov 25	Test 2	
12	Dec 2	Assignment Q&A, Semester Wrap up	Assignment 1 (Dec 7) (+ 2 day grace period)

WINTER SEMESTER			
Week	Class Date	Topic	What's due when?
1	Jan 13	Semester I Review Semester II Preview	R Tutorials 1 – 3 (Jan 15)
2	Jan 20	One-way ANOVA	
3	Jan 27	Repeated measures ANOVA	Apply It 5 (Jan 27 - 30)
4	Feb 3	Factorial ANOVA	
5	Feb 10	Non-parametric tests	Apply It 6 (Feb 10 - 13)
6	Feb 17	Test 3	
		<i>WINTER READING WEEK</i>	
7	Mar 3	Chi-square Tests	
8	Mar 10	Correlation	Apply It 7 (Mar 10 – 13)
9	Mar 17	Linear Regression	
10	Mar 24	Take a mental health day! (no class)	Apply It 8 (Mar 24 – 27)
11	Mar 31	Test 4	
	Apr 7	<i>No in person class - University closed</i>	
12	Apr 10**	Assignment Q&A, Course wrap up	Assignment 2 (Apr 11) (+2 day grace period)
note Monday April 10 will follow a Friday timetable to make up for the university closure on Good Friday, April 7			