

**Faculty of Health**  
**Department of Psychology**  
**PSYC 2022 3.0 Section M: STATISTICAL METHODS II**  
**Friday / 11:30am – 2:30pm / Vari Hall C**  
**Winter/2024**

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All lecture content will be pre-recorded and posted on eClass. You will be expected to watch the videos before our in-person class. You will have the opportunity to submit questions via eClass about the video content by 11:59pm the night before or you can also ask questions during our class time.

We will **meet in person every Friday at 11:30am for approximately 1.5 hours** where the teaching team (i.e., instructor and TAs) will address questions. You will also participate in some activities/demonstrations to help with your understanding of the concepts covered in the lecture.

Quizzes will take place during the assigned class time (i.e., 11:30am – 2:30pm) and therefore **it is expected that you will be available during this time.**

#### **Instructor and T.A. Information**

Instructor: Eric Tu

Office Hours: By appointment

Email: [erictu@yorku.ca](mailto:erictu@yorku.ca)

<b>T.A.</b>	<b>Hannah Tran</b>	<b>William Fisher</b>
<b>Email</b>	<a href="mailto:tranhan@yorku.ca">tranhan@yorku.ca</a>	<a href="mailto:wfshr@yorku.ca">wfshr@yorku.ca</a>
<b>Office Hours</b>	By appointment	By appointment

**When sending an email please include PSYC2022M in the subject box and your full name and student number in the signature of the message.** Emails that do not follow this format risk being missed.

Please allow the instructor and TAs up to 3 business days to respond to your emails. If you send an email over the weekend, please do not expect a response until the normal work week (Monday-Friday).

**Course Prerequisite(s): Course prerequisites are strictly enforced.**

- HH/PSYC 2021 3.00 (Statistical Methods I)

**Course Prerequisite or corequisite(s):**

- HH/PSYC 1010 6.00 (Introduction to Psychology)

#### **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 on the course eClass site, unless otherwise indicated by the instructor. The site will be your central access point for course materials including the course outline, recorded lectures, slides, descriptions of assignments, other supplemental material to aid your learning, and course updates. Please access eClass frequently as it is required for you to be successful in this course. Not knowing that something was on eClass is not an acceptable excuse for missing any course component. It is the student's responsibility to review and become comfortable with using eClass, however if you have trouble accessing eClass or any materials necessary for the course please reach out to the teaching team.

Note: Please do not send messages to the teaching team through the chat on eClass.

- **Have questions?** Questions about the course content or assessments should be asked in class if possible. This will benefit everyone in the class and helps us manage common issues or questions many students may have. ONLY questions that cannot be answered by looking at the course outline or eClass can be sent to the TAs or course instructor (e.g., questions about your grades, other personal matters). Questions about assessments will not be answered 24 hours prior to the due date. You should review the assessment in advance and ask questions early. This also ensures that everyone has an equal opportunity to access the same information. Emails regarding graded assessments (i.e., stats check, quizzes, assignments) will not be answered within 24 hours within release of the grades. If you have questions about your graded assessments, please take some time to review the feedback you've received, create a list of clear points you'd like to discuss, and then reach out to the teaching team.
- Questions about missed exams, grades, and administrative issues should be directed to the course instructor.

**Course Description**

This course will build upon the concepts covered in PSYC2021. The course will introduce students to additional concepts and techniques related to described and inferential statistics. This includes, but is not limited to, t-tests, analysis of variance (ANOVA), factorial designs, correlations, and regression.

**Program Learning Outcomes**

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

1. Compute inferential statistics for univariate linear models (ANOVA, regression).
2. Interpret and report the results of inferential statistics for univariate linear models.
3. Recognize the limits of inferential statistics.

**Topics Covered**

- Review of basic statistical concepts
- Independent samples t-test

- Dependent samples t-test
- One-way Independent Groups ANOVA (with contrasts)
- Two-way Independent Groups ANOVA (with interaction and contrasts)
- One-way Repeated Measures ANOVA (with contrasts)
- Correlation (including partial correlation)
- Simple Regression
- Multiple Regression

*\*Effect size is included as part of all inferential statistics covered in this course.*

### Specific Learning Objectives

- Develop a deeper understanding of the statistical concepts covered in this course.
- Demonstrate the ability to develop statistical hypotheses (i.e., null and alternative) for various situations.
- Identify and apply the appropriate statistical analysis/analyses to address specific research question(s) and/or hypotheses.
- Recognize the limits of conclusions based on inferential statistics (e.g., statistical vs. practical significance).
- Understand the strengths/weaknesses of different research designs.
- Compute and interpret the results of various statistical analyses from R statistical software, and write up the results in APA format.

### Required Software & Text

#### Required Software

Students are **required** to use R statistical software to complete activities and assignments in the course. Although there are various ways R can be accessed, it is recommended that students download R and R Studio (<https://posit.co/download/rstudio-desktop/>)

Students are also **required** to use iClicker Student (available through on the web at <https://app.reef-education.com> or through the iOS or Google Play Store) to participate live during weekly in-person classes. More information on how to enroll in this course through iClicker Student can be found on eClass.

**Students should expect to bring a laptop to the weekly in-person classes** in order to complete the applied activities that may require you to use R. If you do not have your own laptop, you will be paired up with someone who does.

**There is no required text for this course.** All materials and resources to aid in your learning will be provided to you. However, below is a list of recommended texts/resources you can consult. Keep in mind that all course assessments (e.g., quizzes, assignments, etc.) will be evaluated based on the content delivered through lectures, not the content of the texts (they are just for additional optional support).

## Optional text/resources

- Navarro, D. J. *Learning statistics with R: A tutorial for psychology students and other beginners*. <https://learningstatisticswithr.com/book/> [FREE]
- Cote, L. R., Gordon, R. G., Randell, C. E., Schmitt, J., & Marvin, H. *Introduction to statistics in the psychological sciences*. <https://open.umn.edu/opentextbooks/textbooks/an-introduction-to-psychological-statistics> [FREE]
- Gravetter, F. J., & Wallnau, L. B. *Statistics for the behavioral sciences*. Wadsworth Publishing, Cengage Learning. (8th -10th edition would be useful)
- Howell, D. C. (2016). *Fundamental Statistics for the Behavioral Sciences* (9th ed.). Wadsworth Publishing, Cengage Learning.
- APA7 Guide: [https://owl.purdue.edu/owl/research\\_and\\_citation/apa\\_style/apa\\_formatting\\_and\\_style\\_guide/reference\\_list\\_books.html](https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/reference_list_books.html)

## Course Requirements and Assessment:

Assessment	Date of Evaluation (if known)	Weighting
Participation	Course Outline Quiz	1%
	iClicker	5%
R Tutorials	January 19	3%
Stats Check 1	February 5	5%
Stats Check 2	March 11	5%
Stats Check 3	March 25	5%
Quiz 1	February 16	15%
Quiz 2	April 5	15%
Assignment 1	February 26	23%
Assignment 2	April 1	23%
<b>Total</b>		<b>100%</b>

## Description of Assignments

**Participation:** You will have the opportunity to gain **6%** for participating in various activities throughout the course such as completing surveys related to course information (e.g., course outline), responding to iClicker questions during our weekly class meeting or outside of our weekly class meeting, etc. The Course Outline Quiz is mandatory and will be worth 1% of your overall grade. iClicker will be used in classes and will make up 5% of your overall grade. Students are allowed to miss up to 3 of the 8 classes with iClicker questions. To attain the full participation grade for a class, student's must respond to at least 80% of the questions asked in a given lecture. More information about using iClicker for this course will be available in the "In Class Participation" folder on eClass.

**R Tutorials:** Up to 3% of your overall grade can be earned by completing a series of online tutorials introducing students to R statistical software. These tutorials will build on skills and knowledge you will acquire in the course. Participation points will be awarded for the completion of three short quizzes corresponding to each of the tutorials. More information on how to access the tutorials will be posted in the “R Tutorials” folder on eClass. The deadline to complete all three of the quizzes is by 11:59pm on January 19. You can submit the R Tutorial Quizzes up to three days past the deadline without penalty (including weekends). This does not mean the deadline is 11:59pm on January 22, instead, please plan to complete the quizzes by January 19 and use the extra days if needed. **Submissions will not be accepted after the three day grace period (i.e., if you try to submit after 11:59pm January 19, you will receive a 0).**

**Stats Check:** Students will complete three Stats Checks throughout the course, worth 5% each (15% total). These activities **will be completed outside the normal class meeting time and students will be allowed to work individually or in groups of two only.** The activities cover key material taught throughout the course and may take the form of a scenario followed by questions. More information about the Stats Checks will be available in the “Stats Checks” folder on eClass. You can submit the Stats Checks up to three days past the deadline without penalty. For example, the first Stats Check is due on February 5<sup>th</sup> by 11:30am. **This does not mean the deadline for the first Stats Check is 11:59pm on February 8<sup>th</sup>,** instead, please plan to complete the Stats Checks by the assigned deadline and use the extra days only if needed. **Submissions will not be accepted after the three day grace period (i.e., you will receive a 0).**

**Quizzes:** Quizzes will be non-cumulative and cover the material from lectures, assigned materials, classes & stats check activities. The format of the quizzes may be a mix of multiple-choice and open-ended/short-answer questions (e.g., defining concepts or responses to analysis questions). **Quizzes will take place during the assigned class time: 11:30am-2:30pm.** More information about the content, format and length of the quiz will be provided in advance of the due date in the “Quizzes” folder in eClass.

**Assignments:** The purpose of an assignment is to further evaluate your conceptual understanding of the material covered in class, to demonstrate that you can perform the types of analysis covered in this course and that you can interpret/report the results. Assignments will be completed outside the normal class time and students are expected to complete their assignment individually. More information will be provided in advance of the due date in the “Assignments” folder in eClass and you will receive each assignment in advance of the due date. You can submit the Assignments up to three days past the deadline without penalty. For example, the first Assignment is due on February 5<sup>th</sup> by 11:59pm. **This does not mean the deadline for the first assignment is 11:59pm on February 8<sup>th</sup>,** instead, please plan to complete the assignments by the assigned deadline and use the extra days only if needed. **Submissions will not be accepted after the three day grace period (i.e., you will receive a 0).**

### **Class Format and Attendance Policy**

The course will take place in person at 11:30am each week, except for the week of February 9<sup>th</sup> (virtual class) or unless there is a quiz scheduled on that day. In class we will discuss any

questions you may have and engage in various activities. Students are strongly encouraged to attend the class sessions as the material covered during in-person classes will build on the previous week's material and enhance your overall learning and help you stay on track with the overall course material.

### **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 2023-24](#)

### **Missed Tests/Midterm Exams/Late Assignment**

**Missed Quizzes:** For any missed quiz students MUST complete the Missed Quiz form found in the “Quizzes” folder on eClass. **Failure to complete the form within 48 hours of the original quiz dates will result in a grade of 0 for the missed quiz.** At this time, due to COVID-19, an Attending Physician's Statement (APS) is not required, however, **a reason or explanation for missing an evaluated component in the course must be provided.** Once you have notified us of a missed quiz a TA will contact you to schedule a makeup quiz (which will also be held online). If you miss your scheduled makeup quiz, you must again complete the Missed Quiz form with a reason and the weighting will be redistributed across the remaining assessments in the relevant category. **Please note that different assessments cannot be used as a substitute for a missed quiz (i.e., a stats check or an assignment cannot be used as a substitute for a missed quiz).**

**Late R Tutorial Quizzes/Stat Checks/Assignments:** The R Tutorial Quizzes, Stat Checks and Assignments are all allowed a three day grace period (including weekends) after their respective deadlines, which acts as built-in extra time for their completion. **Submissions after the three day grace period will not be accepted (i.e., will receive a grade of 0).** Students should aim to submit their work by the original deadline time, and use the extra days only if needed.

For example, Assignment 1 is due on February 16<sup>th</sup>, and has a 3-day grace period so it can be submitted until February 19<sup>th</sup>, but students should work toward submitting on February 16<sup>th</sup>. If a student has not submitted Stats Check 1 by February 19<sup>th</sup> at 11:59pm, they will receive a grade of 0.

This policy holds for all three (3) R Tutorial Quizzes, all three (3) Stats Checks, and the two (2) assignments in the course and their respective deadlines. If there are exceptional cases in which you cannot meet this deadline, please email the instructor as soon as possible to discuss it.

**Please note that a quiz cannot be used as a substitute for a stats check or assignment and a stats check cannot be used as a substitute for an assignment or vice versa.**

**Missed (iClicker) Participation:** Students are only required to participate in 5 out of the 8 lectures in which we will use iClicker. In a given class, students must respond to at least 80% of

the questions to receive credit for that day. That is, you can earn full grades by responding to 80% of the questions in five of the eight lectures that have iClicker questions over the semester. Please note that attending live lectures and participating is the only way to earn these grades.

### Add/Drop Deadlines

For a list of all important dates please refer to: [Undergraduate Fall/Winter 2023-2024 Important Dates](#)

	Fall (Term F)	Year (Term Y)	Winter (Term W)
Last date to add a course <b>without permission</b> of instructor (also see Financial Deadlines)	September 20	September 20	January 22
Last date to add a course <b>with permission</b> of instructor (also see Financial Deadlines)	September 28	September 28	January 31
Drop deadline: Last date to drop a course without receiving a grade (also see Financial Deadlines)	November 8	February 8	March 11
Course Withdrawal Period (withdraw from a course and receive a grade of "W" on transcript – see note below)	November 9 – December 5	February 9- April 8	March 12- April 8

### 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.

### Information on Plagiarism Detection

Turnitin will be used to detect any evidence of plagiarism.

### Electronic Device Policy

This course requires students to have access to a laptop during in-person sessions in order to work on practice problems using statistical software. Students may pair with others during class to work on practice problems. Students will also need access to a computer and internet connection to access eClass for content, quizzes and recorded lectures. It is expected that you would complete quizzes in a manner that does not include consulting an unauthorized source during the quiz. 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.

The teaching team, department and York University 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 course instructor 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 (e.g, don't post the link publicly on Reddit) and share only with other members of PSYC 2022 M.

Participation in illicit activity (e.g., cheating) that occurs in such groups may put your academic integrity at risk. Sharing of or requests for answers through 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, failing grade in the course, etc.).

The sharing of screenshots of emails or answers provided by the teaching team is not permitted in course community group chats. **All email communications between student and the 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 PSYC2022 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

Week	Date	Topic	Note
1	Jan 12	Course Overview Introduction to R	
2	Jan 19	Review of Key statistical concepts Working with data Introduction to R	<b>Course Outline Quiz due Jan 19</b> <b>R Tutorials Quizzes due Jan 19</b>
3	Jan 26	Independent samples (between subjects) designs Independent samples t-test	
4	Feb 2	One-Factor Analysis of Variance (One-way ANOVA)	<b>Stats Check 1 due Feb 5</b>
5	Feb 9	Two-Factor Analysis of Variance (Two-way ANOVA)	<b>*Class will take place over Zoom</b>
6	Feb 16	<b>Quiz 1 (15%) – COVERS WEEKS 3, 4, 5</b> <b>DROP-IN ZOOM SESSION</b>	<b>Assignment 1 due Feb 16</b>
7	Feb 23	NO CLASS – WINTER READING WEEK	
8	Mar 1	Dependent samples (within subjects) designs Dependent samples t-test	
9	Mar 8	Repeated Measures Analysis of Variance (Repeated measures ANOVA)	<b>Stats Check 2 due Mar 11</b>
10	Mar 15	Correlations	
11	Mar 22	Linear/Multiple Regression	<b>Stats Check 3 due Mar 25</b>
12	Mar 29	<b>Catch up day / DROP-IN SESSION</b>	<b>Assignment 2 due Mar 29</b>
13	Apr 5	<b>Quiz 2 (15%) – COVERS WEEKS 8, 9, 10, 11</b> <b>DROP-IN ZOOM SESSION</b>	