

Faculty of Health
Department of Psychology
PSYC 2020 6.0 Section: E STATISTICAL METHODS I AND II
Online via Zoom Fridays 11:30am – 2:30 pm
2021 – 2022 Y

Organization of the Online Course

1. There is a “synchronous” and “asynchronous” element in the course. We will hold “lectures” where we present new material (asynchronous). Think about these as “classes”. We will also have a review “class” (synchronous) which we will record. All of this will be available in eClass/Moodle.
2. A pre-recorded PowerPoint (audio and visual) lecture will be uploaded to eClass/Moodle about a week before each class. These pre-recordings will be about 40 minutes each- and you can start/stop/pause them at your own speed at any time. You need eClass/Moodle access for this element of the course, on a device that allows you to see and hear the PowerPoint material. But you do not need to have the PowerPoint software program on your device.
3. We will also hold a live Zoom “drop-in” session that is optional and will be recorded for your viewing at any time. The session will be on the date and time allocated for the course (See schedule later in this course outline). The purpose of these Zoom sessions is to quickly review the key elements that were detailed in the eClass/Moodle PowerPoint “lectures” that you had available prior to this Zoom live session. During the Zoom session, your mics will be muted, but you can use the Zoom Chat feature to ask questions. We had to mute your mics because we have about 70 students in the course and it will be chaotic if everyone wants to talk at once.
4. Our TA may hold additional Zoom sessions to help students who are struggling with some of the course material. These additional Zoom sessions will be announced on eClass/Moodle including sending you an email. We may also post additional PowerPoint material if required.
5. This course is divided into about 20 main topic areas – which follow closely to the 18 chapters and appendices that we will cover in our text. You should begin the course in Topic 1 and complete it before moving onto the next topic. The topics have been organized in sequential order, so that you build skills and enhance knowledges as you move from one topic to the next. While you have some leeway as to when you complete the topics, a suggested timeline for completing the course has been provided in the schedule later in this course outline. This suggested schedule takes into account the timing of activities and exams.
6. There will be 5 tests worth 15% each plus an assignment worth 25%. The schedule presented later in this course outline lists the timing and content of the tests.

Technical requirements for taking the course:

1. Students will need equipment to gain access to eClass/Moodle.
2. Students will also need access to Zoom for video conferencing during tutorial sessions.
3. In addition to stable, higher-speed Internet connection, students will need a computer with webcam and microphone, and/or a smart device with these features.

A way to determine Internet connection and speed: there are online tests, such as Speedtest, that can be run.

Useful links describing computing information, resources and help for students:

[Student Guide to eClass/Moodle](#)

[Zoom@YorkU Best Practices](#)

[Zoom@YorkU User Reference Guide](#)

[Computing for Students Website](#)

[Student Guide to eLearning at York University](#)

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Office Hours	TBD

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 on the course eClass site, unless otherwise indicated by the instructor. The site will be your central access point for course materials

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.

Students will gain a greater understanding of the statistical procedures used by researchers in the behavioural sciences, in addition to the appropriate use and interpretation of statistical results. Topics that will be covered include: Descriptive statistics, hypothesis tests using t-tests (for independent and related measures); Analysis of variance (ANOVA) for repeated measures, independent measures and two factors; multiple comparison procedures (post-hoc analysis), correlation and prediction, and non-parametric techniques. Students should be able to identify the correct statistical test to use.

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 and Spearman)
- 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)
- Correlation (including partial correlation)
- Simple Regression
- Multiple Regression
- Non-Parametrics
- **Effect size is included as part of all inferential statistics covered in this course.*

SCHEDULE AND CONTENT

FALL TERM

Sept 10	Introduction to course Broad overview - Descriptive Statistics- mode, median, mean
Sept 17	Broad overview continued - range, variance, standard deviation, (measurement, Summation notation)

Sept 24	(Section numbers refer to text - 10th edition of book)
	1.1 Populations and samples
	1.3 Variables and measurement
	1.4 Statistical notation
	2.1 -2.3 Frequency distributions- tables, graphs, shape
	2.4 Percentiles, percentile ranks
	3.1 – 3.6 Central tendency
	4.1 Range
	4.2 – 4.6 Standard deviation, variance
Oct 1	5.1- 5.6 z-Scores
Oct 8	6.1- 6.3 Probability
Oct 15	NO CLASS – FIRST TERM READING WEEK
Oct 22	7.1 – 7.4 The distribution of sample means
Oct 29	TEST 1 (3 hours: Worth 15%-covers Chapters 1 - 7) No zoom clas
Nov 5	8.1 – 8.6 Hypothesis testing
Nov 12	9.1 – 9.4 t-statistic
	10.1 – 10.5 Hypothesis test with two independent samples
Nov 19	11.1 – 11.5 Hypothesis test with related samples Estimation
Nov 26	TEST 2 (3 Hours: Worth 15%-covers Chapters 8 - 11) No zoom class
Dec 3	15.1 – 15.4 Correlation - Pearson
	17.1 – 17.4 Chi-Square statistic
Dec 9	TEST 3 (3 Hours: Worth 15% - covers Chapters 15, 17 & Choosing the right statistics for Chapters 8-11, 15, 17) No zoom class

WINTER TERM

Jan 14	12 ANOVA introduction and Single Factor Independent Measure Design
Jan 21	13 ANOVA Repeated Measures
Jan 28	14 ANOVA Two-Factor (Independent Measures)
Feb 4	12 – 14 ANOVA REVIEW
Feb 11	TEST 4 (3 Hours: Worth 15%-covers Jan 14 – 28 Topics) no Zoom Class
Feb 18	NO CLASS – WINTER TERM READING WEEK
Feb 25	15 CORRELATION (Review Pearson) Spearman, Partial Correlation
Mar 4	16 Regression – Equations and Analysis of Regression
Mar 11	16 Multiple Regression
Mar 18	Appendicies E1 – E3 Non-parametric tests (Mann-Whitney; Wilcoxon)
Mar 25	TEST 5 (3 Hours: Worth 15%-covers Feb 18 - Mar 18 Topics) no Zoom Class
Apr 1	Choosing the right statistics

Apr 8 REVIEW CLASS

Apr 15 **Assignment Due (Worth 25%) – Based on the Apr 1 topic. Electronic to TA**

Required Text

COURSE MATERIALS REQUIRED (Book, MindTap online resource)

Three Course Text Options (PICK ONLY 1 OPTION).

Below are the purchasing options for students. Options are available through the York bookstore. If an option you want is not available on the York site, try the Cengage site.

The text for the course is Gravetter & Wallnau's Statistics for the Behavioral Sciences 10th edition. The text publisher also has available an online system called MindTap. It is an aid and contains many problems that you can work on. MindTap is not mandatory for the course. MindTap was designed to work with the same author's text called the Essentials of Statistics. You do not want to buy that Essentials book, but MindTap associated with that book is really good. In a nutshell, your recommended options are to buy a printed copy of the 10th edition (available as a text or looseleaf edition) or an electronic edition of the 10th edition. You may also want to obtain an electronic version of the online Essentials MindTap resource. You can likely also do well in the course with the 9th edition if you can get it as a used text. The texts only give half of the answers at the back of the book. While the lectures are based on the 10th edition, we will put on eClass the answers for the problems at the end of the chapters for both the 9th and 10th editions.

Option #1 – bundle of: loose-leaf version of the Gravetter 10th ed Stats text + CUSTOM CHAPTER + MindTap Printed Access Card (12 month access)

Package ISBN: 0176882480

Price: \$125.95

Option #2 – bundle of: Statistics for the Behavioral Sciences 10th edition text + CUSTOM CHAPTER + MINDTAP Printed Access Card (12 month access)

Package ISBN: 9780176853020

Price: \$180.95

Option #3 – paperless option - MindTap printed access card (includes e-book) for Gravetter Stats for The Behavioral Sciences, 10th Ed (12 month access). Please ask at the bookstore for this option.

ISBN: 9781337280754

Price: \$99.95

The bookstore is open ONLINE only and will ship texts to students with NO shipping fee. Bookstore web site: <https://www.bookstore.yorku.ca/>

If students already have a used text, all they need is Option #3 – the MindTap access card, which they can purchase through the bookstore web site. The bookstore will email them with an access code.

If students just buy access to MindTap, they may be wondering about the custom chapter. This chapter contains statistical tests that are used in the second stats course (PSYC 2022) so it's not needed right now. Students can buy this chapter at the bookstore for \$9.95.

MindTap gives students access for three course attempts, which means that a student could withdraw from this course and take it again at a later date and still have access to MindTap. The courses don't have to be consecutive – students could take the course now, withdraw, and then take it again in September 2022.

Course Requirements and Assessment:

Assessment	Date of Evaluation		Weighting
Test 1	Oct 29	3 hours	15%
Test 2	Nov 26	3 hours	15%
Test 3	Dec 9	3 hours	15%
Test 4	Feb 11	3 hours	15%
Test 5	Mar 25	3 hours	15%
Assignment	Apr 15		25%
Total			100%

Description of Assignment – Due April 15

Overview

Submit a single word-processed document using appropriate word-processing software (e.g., Word, LibreOffice, L^AT_EX, R Markdown). Embed all images in the document. Please submit the document in .doc, .docx, .odt, or .pdf file format (.pdf is preferred). Submit the document using the *Final Assignment* submission portal on the course eClass page. All data required to complete the assignment are available in text format throughout this document. To aid students who opt to use statistical software, all the text-formatted data in this document have been duplicated into a series of .csv files also located in the Final Assignment folder. Each .csv file is intuitively labeled according to the Long Answer question for which it is intended (e.g., file "Q1.csv" contains the data for Long Answer question 1).

Scenarios

For these questions, you are given brief summaries of research scenarios, specific hypotheses, and accompanying data. You are required to conduct appropriate statistical analyses of the data to draw conclusions for each research hypothesis. Write a brief report of the results in which you

- Highlight all inferential statistical effects (e.g., There was a strong main effect of Factor A)
- Discuss the qualitative nature of any such effects (e.g., Group A scored higher on <dependent variable> than group B)
- Report the results of your statistical tests using the appropriate APA formatting for each respective statistical test (e.g., $t[12] = 2.53$, $p = .026$, $d = 0.74$, 95% CI = [1.34, 4.78])
- Refer back to the research scenario to make a broad declarative statement about how well the research hypothesis is supported

You are free to use statistical software (e.g., SPSS, SAS, R, sciPy, MATLAB) to conduct statistical analyses and construct data plots. However, you must provide screenshots of your output as part of your submission. Please embed these images in the word-processed document, rather than submitting them separately. If you would prefer to compute statistical tests and construct data plots by hand on paper, please take photos of your work and embed them into your submission in much the same manner. Alternatively, you could type out your hand calculations, but this would likely be rather tedious and we therefore advise against it.

If you opt to use statistical software, please report exact p values for each statistical test (e.g., $p = .026$). Otherwise, if you perform hand calculations, report p values in relation to (e.g., less than) the appropriate α -level (e.g., $\alpha = .05$) and include the critical values from the relevant statistical tables provided in the textbook for each statistical test (e.g., $p < .05$; $t_{crit} = 2.18$).

Class Format and Attendance Policy

We do not take attendance. Please contact your TA for on-line appointments in case you are having any difficulties in understanding the 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 2021-22](#)

Missed Tests/ Late Assignment

All tests are three hours in length. They may be completed within the 24 hour period on the test date. In other words- students choose which 3 hour period they wish to take the test on the date of the test. The latest time that you may start a test is 9 pm so that you can get the full three hours- ending at mid-night.

For any missed quiz or late assignment, students MUST complete the following online form which will be received and reviewed in the Psychology undergraduate office. At this time, due to COVID-19 an Attending Physician's Statement (APS) is not required, however, a reason for missing an evaluated component in the course must be provided.

[HH PSYC: Missed Tests/Exams Form](#). Failure to complete the form within 48 hours of the original deadline will result in a grade of zero for the missed quiz or late assignment.

Add/Drop Deadlines

For a list of all important dates please refer to: [Fall/Winter 2021-22 Important Dates](#)

	Year (Term Y)
Last date to add a course without permission of instructor (also see Financial Deadlines)	Sept. 21
Last date to add a course with permission of instructor (also see Financial Deadlines)	Oct. 26
Drop deadline: Last date to drop a course without receiving a grade (also see Financial Deadlines)	Feb. 11
Course Withdrawal Period (withdraw from a course and receive a grade of "W" on transcript – see note below)	Feb. 12 - April 10

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 will be delivered in an online format and therefore electronic devices (e.g., tablets, laptops) are permitted during class time for course-related purposes. It is expected that you would complete tests/exams in a manner that does not require consulting an unauthorised source during an examination.

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.

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 Psych 2020 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](#).